A CONTROLLED STUDY OF FARADIC DISRUPTION OF OBSESSIVE IDEATION IN THE TREATMENT OF OBSESSIVE NEUROSIS

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ABSTRACT

Previously found successful clinical results led to a proposal that improvement in obsessive-compulsive symptoms could be effected by the application of an aversive stimulus (Faradic Disruption) to the images and thoughts that patients expressed about their symptoms (obsessive ideations).

A controlled study was initiated in which an experimental group of patients suffering from obsessive neurosis received 30 sessions of Faradic Disruption over a three-month period and a waiting-list control group with the same diagnosis was delayed by three months before receiving treatment. An attempt at complete matching of subjects was only partially successful, and a final total of six subjects in the experimental group and four in the control group was achieved.

Assessments of treatment progress were made through the use of patient subjective ratings of their symptoms, an independent psychiatric rating of symptoms, a psychiatric rating of general adjustment and two psychometric tests, the IPAT Self-Analysis Questionnaire and the Fear Survey Schedule. The latency of image formation, i.e. the length of time taken by the patient to form an image on command, was used as the main experimental measure. Assessments were made prior to treatment, after 10 treatments (or 1 month waiting control), after 20 treatments (2 months waiting

control) and after 30 treatments (3 months waiting control). Follow-up was initiated on all patients successfully completing the treatment.

Clinical and experimental results showed that Faradic Disruption was particularly effective in the reduction of target symptoms and produced a corresponding large increase in the latency of formation of experimentally treated images. The treatment also produced a general improvement in patients' adjustment and there was a tendency for the treatment effects to extend to non-target symptoms. There was no evidence that the therapeutic endeavour resulted in changes in general situational or trait anxiety.

Follow-up for a median period of three months showed that clinical improvement persisted but some relapse was noted in one patient.

In all, six of seven patients who completed treatment were rated as being considerably improved while one patient failed to improve.

The nature of obsessive ideations in obsessive neurosis and the nature of the Faradic Disruption treatment are discussed.

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INTRODUCTION

The Diagnostic and Statistical Manual for Mental disorders (American Psychiatric Association, 1968) defines an obsessive-compulsive neurosis as a

> ".....disorder characterized by the persistent intrusion of unwanted thoughts, urges, or actions that the patient is unable to stop. The thoughts may consist of single words or ideas, ruminations, or trains of thought often perceived by the patient as nonsensical. The actions vary from simple movements to complex rituals such as repeated handwashing. Anxiety and distress are often present either if the patient is prevented from completing his compulsive ritual or if he is concerned about being unable to control it himself."

In relation to other psychiatric disorders, obsessive neurosis is generally considered to be one of the most chronic and severe (Mayer-Gross, Slater & Roth, 1954) and has been found to be particularly resistant to therapeutic interventions of all types (Goodwin, Guze & Robins, 1969). The most recent endeavours in the treatment of this complex disorder have come from the field of behaviour therapy and a diversity of behaviour modification techniques have now been applied with varying degrees of success.

The Anxiety/Drive Reduction Model

Research into the behaviour modification of obsessive-compulsive neurosis, spanning the past two decades, has proceeded primarily along one main theoretical plane: the anxiety/drive reduction model (Metzner, 1963). In this paradigm, obsessive-compulsive behaviours are essentially

regarded as ideational or motor acts which arise in response to anxiety provoking cues and which become fixated* as a result of strong negative reinforcement in the form of anxiety/drive reduction. To use a simple hypothetical example, a particular substance such as urine might evoke an exceptionally severe anxiety response in a given individual. Subsequent washing behaviour, arising in response to that cue may result in a decrease in the anxiety, thereby causing an increment in its habit strength. Continued repetitions of the cycle might eventually lead to a fixation of the washing behaviour and the processes of stimulus and response generalization may lead to a fixation of washing behaviour to other cues or lead to other ritualistic behaviours developing in response to the original cue(s).

Early in the historical development of this model, various authors (Wolpe, 1958; Metzner, 1963; Eysenck & Rachman, 1965; Mather, 1970) felt the need to provide laboratory analogues for the development of obsessive-compulsive behaviour based on experimental research in humans and animals. Although never directly stated, it appears that this need arose in response to two perceived problems: a) that there were examples of 'compulsive' behaviours which did not appear to fit the anxiety/drive reduction model; and

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*The term 'fixation' or 'fixated responses' is presently being used in the context found in most current discussions of the behavioural modification of obsessive neurosis and should be roughly interpreted as referring to behaviours that are strongly conditioned, performed repeatedly and apparently without motive (Metzner, 1963), stereotyped and rigid (Eysenck & Rachman, 1965), etc.

b) that some explanation was necessary to differentiate the obsessional patient who engages in elaborate ritualistic behaviour from the phobic patient who presents much simpler avoidance behaviour.

Consequently the discussions have ranged from a review of superstitious behaviour in animals (Skinner, 1948) to fixated responses to insoluble problems in humans (Marquart & Arnold, 1952). Probably the most popular analogue among all the reviewers, is based on an experiment with dogs (Fonberg, 1956) in which previously learned avoidance responses (leg lifting, head shaking) reappeared under conditions of an experimental neurosis which bore no direct similarity to the original learning situation. The implication is that in patients suffering from obsessive neurosis, the ritualistic responses are precisely such earlier-learned avoidance responses which arise under new stress conditions.

Later theoretical discussions of the model have tended to drop most of the experimental analogues presumably because it has been realized that the human clinical population itself provides enough material and problems to warrant analysis. Even Metzner (1963) who originally proposed most of the analogues, stated ".....in many cases of obsessional neurosis .....the behaviour is still elicited by definable situations and reinforced by obvious rewards" (p.232), implying that the use of analogues was unnecessary in these cases. In fact, most of the cases which were presented as 'exceptions to the rule' did not provide enough information that one could adequately

determine whether or not the anxiety/drive reduction model could in fact be applied. As to the differentiation of obsessives and phobics, it also presently appears that this can be adequately made at a clinical level (c.f. Worsley, 1970).

Perhaps even more importantly, earlier theoretical formulations tended to drift away from the existing nosology for obsessive-compulsive neurosis. Many of the cases which appeared difficult to analyze were such disorders as exhibitionism, compulsive eating and other behavioural problems which although they appeared to have a 'compulsive' element to them, were not strictly speaking obsessive-compulsive disorders. It is now being realized that the lack of delineation of which problematic behaviours should and which should not be considered obsessive neuroses is a major obstacle to the provision of a cogent theoretical framework (c.f. Yates, 1970).

Thus, while it is not being suggested that laboratory analogues have no value in a discussion of this disorder, it is probably better to restrict conceptualizations to the clinical population at least until there is an overall clarification at this level.

Anxiety/Drive Reduction Criticisms

The anxiety/drive reduction model, for the clinical population, has in fact received a considerable number of cogent criticisms. The first criticism stems from an observation by Wolpe (1958) that some obsessional patients exhibit compulsive ritualistic behaviours which appear to augment

their anxiety rather than reduce it. It is suggested that the anxiety/drive reduction model cannot in fact be applied in these cases. The second criticism comes from observations by Walker & Beech (1969) that some obsessionals do not appear to be distressed before they carry out their rituals and therefore there is no anxiety to be reduced. They also suggest that in some obsessional patients, mood is an important factor and that performance of ritualistic behaviour sometimes improves the mood state, especially if the ritual is of short duration, but it is similarly noted that the mood state also deteriorates under these conditions. They suggest (see also Beech, 1971) that these are clear examples which directly violate the anxiety/drive reduction model.

A third criticism stems primarily from the experimental literature on avoidance behaviour (Herrnstein, 1969) in which it has been found that avoidance behaviour can develop in response to environmental cues without intervening anxiety or anxiety reduction. It is argued that avoidance and autonomic behaviours are in fact independently occurring responses to these cues.

To this list of criticisms can be added a fourth problem, which is implicit in many discussions, namely, the previously mentioned discrepancy between phobic and obsessional patients and why such divergent forms of behaviour are developed.

In response to these criticisms, the first experimental studies of clinical obsessional behaviour were initiated by

Rachman and his co-workers at the Maudsley Institute.

In the first experiment (Hodgson & Rachman, 1972) 12 obsessive-compulsive patients characterized by contamination fears and ritualistic washing behaviour were asked to rate the degree of subjective anxiety/discomfort that they experienced in response to each of the four following conditions that they participated in: 1) touching a contaminated object; 2) washing immediately after touching the object; 3) being delayed by one-half hour before being permitted to wash; and 4) having the wash interrupted. The term anxiety/discomfort was used in this study as many of the patients did not feel that the term 'anxiety' adequately described what they felt whereas the term 'discomfort' was more appropriate for them. The authors argue that the two terms in reality refer to the same process of autonomic arousal.

Each subject served as his own control in a balanced design by touching a neutral object. Pulse rate fluctuations were also recorded at the time and the following conclusions were made:

> "Touching a contaminated object does produce an increase in subjective anxiety/discomfort and there is a trend for pulse rate variability to increase. The completion of a washing ritual after such contamination does produce a reduction in subjective anxiety/discomfort and a tendency for pulse rate variability to decrease. The interruption of a washing ritual after such contamination produces neither an increase nor a decrease in subjective anxiety/discomfort nor an increase or decrease in pulse rate variability. (p. 115)"

In the second experiment (Roper, Rachman & Hodgson, 1973) 12 obsessional patients characterized by pervading doubt

coupled with compulsive checking rituals were studied in a manner identical to the first experiment except that these patients were asked to engage in a potentially harmful activity instead of simply touching a contaminated object. In a similar fashion it was concluded that performing these acts does lead to an increase in subjective anxiety/discomfort and that subsequent checking does reduce it.

This second experiment also presented a comparison between the results found with these obsessional "checkers" and the obsessional "washers" studied by Hodgson & Rachman (1972). It was found that interacting with the feared object produces greater increases in anxiety/discomfort among the washers than among the checkers but that decreases in anxiety/discomfort following completion of the ritualistic behaviour were roughly equal. The authors explained this discrepancy by suggesting that the checkers may have viewed themselves as not greatly threatened as they were in a relatively safe environment (the hospital) where the consequences they usually feared were not likely to take place.

Perhaps most importantly, on 7 of the 36 occasions in which obsessional checkers were studied, completion of the checking rituals was rated as causing an increase in subjective anxiety/discomfort. No instances of this nature were found among the obsessional washers.

These two experiments appear to confirm, at least for these two types of obsessional disorder, that anxiety/drive reduction is the prime mode of reinforcement of ritualistic

behaviour. On the other hand, the fact that some cases of anxiety-augmenting rituals were found, still poses problems for the model. The authors' rejoinder is that the findings do not in fact contradict the basic hypothesis, for "..... if checking gives relief or avoidance of discomfort on some occasions then it may fail to extinguish even though on other occasions repetitive checking increases discomfort." (Roper et al., 1973). This appears to be basically a statement of the effects of partial reinforcement.

In response to the criticism that avoidance behaviour often develops in the absence of anxiety, Hodgson & Rachman (1972) state that this does not necessarily mean that the anxiety/drive reduction phenomenon is not occurring in these instances. Essentially these authors do not deal with the question of differentiating obsessional patients from phobic patients on behavioural grounds.

An excellent discussion of the anxiety/drive reduction hypothesis is provided by Worsley (1970) although it is somewhat hampered by the fact that he fails to use conventional terminology in some instances. Worsley first tackles the question of the difference between phobic and obsessive patients. He suggests that both engage in escape behaviour when confronted by the anxiety-triggering stimulus and the two only differ in the logical relationship of the escape behaviour to the cue (e.g. bus phobics physically leave the situation while obsessives who cannot do so engage in behaviour like washing which may rid them of the feared substance).

Both phobics and obsessives subsequently learn to avoid the anxiety-provoking cues. Anticipatory avoidance in bus phobics would entail taking steps to stay clear of buses and finding other modes of travel; whereas in obsessives anticipatory avoidance of contamination would involve more washing and cleaning rituals very much like those which they exhibit in escape situations. Worsley then appears to be suggesting that confusion arises because in some instances ritualistic washing is escape behaviour and in other instances avoidance behaviour. This explanation would suggest that those cases observed by Walker & Beech (1969) whose rituals were initiated without previous discomfort, were cases of anticipatory avoidance.

Worsley goes on to state that there is no reason to assume that anticipatory avoidance behaviour should be mood-improving and that the instances where anxiety reduction does take place is, through partial reinforcement, more than enough to provide adequate reinforcement for the fixation of the behaviours.

Overall Worsley has provided an excellent account of obsessional behaviour in terms of the anxiety/drive reduction model and his explanation seems to counter the criticisms which were offered previously.

One comment would appear warranted, however; Worsley describes the anticipatory avoidance behaviour of obsessionals as a 'threat of failure to act in a certain way'. Although this is an interesting interpretation, it does not seem to be necessary in behavioural terms and his simpler explanation

in terms of anticipatory avoidance seems adequate at least until some other finding requires additional postulations.

A fruitful expansion of the anxiety/drive reduction model has been proposed by Walton & Mather (1963). In a study of six obsessional patients, they found that treatment of the conditioned autonomic drive (C.A.D.) in the acute cases was much more successful than in the chronic cases. They drew the conclusion that this result occurred because in the chronic cases the compulsive behaviours had become conditioned to the C.A.D. itself and thereby became functionally autonomous from the original anxiety-eliciting cues.

Bandura (1969) argues against this formulation, however, primarily on the basis that the experimental literature suggests that avoidance and autonomic aspects of fears act relatively independently and that there is no (experimental) evidence that one can become conditioned to the other. Bandura suggests that the difference lies in the fact that over a long period of time, the chronic patients have fixated their compulsive behaviours to a number of other (than the original) cues or set of cues through the process of stimulus generalization and that many of these cues were not presented when treatment of the C.A.D. took place in the chronic cases.

This is a dispute which on the face of it should be directly experimentally testable but, again the argument used by Hodgson & Rachman (1972) in rebutting a similar criticism would also appear to be relevant; that is to argue that the principle does not hold for experimental studies does not

necessarily preclude it from applying to cases encountered clinically.

Overall then, the anxiety/drive reduction model seems to have considerable value in explaining the fixation of compulsive behaviours to anxiety-provoking cues particularly if some of the qualifications proposed by Worsley and Bandura are acknowledged. The model does not explain how the anxiety-provoking cues evolved in the first place although it is generally implied that this occurs in the same manner as has been described for phobias (c.f. Worsley, 1970).

By the very nature of the model, the anxiety/drive reduction theory leads one to focus on the anxiety-provoking cues as the target for treatment. It is predicted that if anxiety responses to those cues are reduced or eliminated then there should also be a corresponding diminution of associated compulsive behaviours, except perhaps in those cases where the compulsive behaviours have become functionally autonomous (depending on what point of view is taken for this phenomenon). In these latter cases some additional therapeutic measures will be necessary if it is assumed that functional autonomy has taken place.

Treatment Methods

Initially two treatment techniques, desensitization (Paul, 1969) and aversion relief (Solyom, Kenny & Ledwidge, 1967) both of which have shown promising results in the treatment of basic phobias, were applied to obsessive fears. In two reports (Bevan, 1960; Walton, 1960) the desensitization

procedure was a manipulation of anxiety using psychotropic drugs based on a reciprocal inhibition hypothesis (Wolpe, 1958). In instances where some attention has been paid to functionally autonomous behaviour, either guided response prevention or punishment (electrical aversion) has been applied subsequent to treatment of the C.A.D.

In single case studies improvement has been reported by Lazarus (1958), Bevan (1960), Walton (1960), Wolpe (1964), Haslam (1965), Lazarus (1965), Solyom (1969), Gentry (1970), Wickramasekera (1970), Tanner (1971) and Rackensperger & Feinberg (1972). In several multiple case studies the results have shown considerable variability; improvement has been reported by Walton & Mather (1963) in three of six cases, by Cooper, Gelder & Marks (1965) in only three of ten cases, by Worsley (1970) in two of four cases, by Saper (1971) in one of two cases and by Solyom, Zamenzadeh, Ledwidge & Kenny (1971) in 11 of 15 cases. On the other hand definite lack of improvement (with desensitization) has been noted by Schmidt, Castell & Brown (1965) in three cases, by Meyer (1966) in two cases, by Marks, Crowe, Drewe, Young & Dewhurst (1969) in one case, by Furst & Cooper (1970) in two cases and by Wisocki (1970) in one case. To date no controlled studies of these methods has been undertaken for obsessive neurosis.

By simple addition, the above cited studies show that 31 cases improved and 26 were unimproved. These results are not overly impressive and some detailed studies would appear warranted at this point if these techniques are to be considered

for regular use with this type of disorder.

Flooding and Modelling

A more recent set of studies has explored the usefulness of modelling and flooding procedures in the treatment of obsessional disorders. An initial case study by Rachman, Hodgson & Marzillier (1970) showed that a modelling procedure, similar to the technique designed by Bandura (1969) was particularly effective in reducing the obsessive fear of dirt and excreta in a 20-year old male. In this treatment, the experimenter modelled a variety of the patient's feared objects (e.g., a smear of dog excrement) and subsequently encouraged the patient to gradually approach it and then touch it himself, beginning with the least anxiety-provoking and working up a hierarchy of items. Guided response prevention was also used to delay compulsive handwashing and the combination of the two procedures resulted in a large decrease in both the obsessive fear and the handwashing. Follow-up on discharge showed a maintenance of improvement.

Baum & Poser (1971) described the treatment of two patients with obsessive problems using flooding, a procedure which previously had been shown to be effective in the treatment of phobias (Boulougouris, Marks & Marset, 1971).

In flooding, patients are confronted in vivo with the feared objects and encouraged to interact with the objects without avoidance or performance of rituals. In the two cases reported by Baum & Poser, considerable symptomatic improvement was obtained and subsequently maintained. Other successes

with flooding have been reported by Rainey (1972) in one case and by Boulougouris & Bassiakos (1973) in three cases.

Rachman, Hodgson & Marks (1971) initiated the first of three studies to compare the results of flooding and modelling in the treatment of obsessional disorders. Ten patients with longstanding obsessive-compulsive neuroses were studied in a cross-over design. All ten patients first received 15 sessions of relaxation training over a three-week period following which five of them received flooding in vivo (15 sessions) and five received modelling (15 sessions). In both the flooding and modelling procedures response prevention was encouraged for increasing periods of time following the treatment sessions. A number of measures were taken to assess the therapeutic effects including clinical rating scales, attitude scales, an overt avoidance test of patient's specific fears, a subjective fear thermometer (in response to the phobic object) and two psychometric tests, the Leyton Obsessional Inventory and the P.E.N. (Psychoticism/Extraversion/Neuroticism) Scale.

The overall results showed that while none of the patients improved with relaxation alone, three of five improved significantly with modelling and three of five improved with flooding. Those who improved continued to do so up to three months follow-up.

On the treatment measurements, the scores of the modelling and flooding sessions were combined and found to be significantly superior to the relaxation sessions for

almost all the ratings. While modelling alone and flooding alone were both superior to relaxation on most measures, they did not appear to differ in effectiveness when compared with each other.

Thus both modelling and flooding produced large decreases in phobic anxiety and phobic avoidance (as rated by an independent assessor); large decreases in phobic avoidance and phobic anxiety feelings twoard the phobic object (fear thermometer); a large decrease in overt physical avoidance of the phobic object (tested in vivo); and other various attitude changes.

In the second study (Hodgson, Rachman & Marks, 1972) a new group of five patients was treated with a technique which combined modelling and flooding. This treatment followed the procedure for modelling except that instead of starting with items low on the fear hierarchy, the order was reversed and the most severe items were presented first.

The cross-over design, treatment, measurement and statistical procedures were the same as in the previous study. Four of the five patients treated by the new technique improved considerably while one did not. The results of this study were combined with those of the original study and showed that this new procedure plus the other two treatments combined were significantly superior to relaxation alone and that modelling plus flooding itself was superior to relaxation alone on most measures. A comparison of flooding, modelling and modelling plus flooding showed that the last of these was superior to the

others on several measures. Finally, follow-up on all 15 patients was carried out to six months and showed that the improvement achieved in the therapeutic sessions had been maintained and even improved upon in some cases.

In the latest study (Rachman, Marks & Hodgson, 1973) five more patients were studied with the modelling plus flooding technique. When the results were combined with the results of the previous 15 patients, it was found that while all three types of treatment were significantly superior to relaxation alone, the superiority of modelling plus flooding over the other two treatments had disappeared.

Thus it appears that modelling, flooding, and modelling plus flooding are equally effective treatments for obsessional neurosis. It is important, however, to make some qualifications of the results. First, the treatment procedure itself is somewhat confounded with the effects of response prevention which was carried out simultaneously with the treatment. Secondly, many of the patients required a considerable number of booster treatments before they were considered eligible for discharge. Thirdly, these treatment forms appear to require that patients be hospitalized during the treatment sessions. Fourthly, many of the patients did not improve with the treatment, the final results being 13 much improved, one somewhat improved and six unimproved. Fifthly, as Rachman (1971) points out, patients who complained primarily of obsessional ruminations without a great deal of overt obsessive-compulsive behaviour were deliberately excluded from the study.

The field of study may have been even more narrow than this, however. Although details of the cases are scanty, it appears that 18 of the 27 cases reported above as having been treated with flooding, modelling, or modelling plus flooding were of the contamination fear/compulsive washing type, while only nine were of other varieties such as compulsive checking, fear of harming others, etc.

Thus there may be not only a qualification by type for the outcome of these treatments but the studies also suggest that a major prognostic factor lies in the number of stimulus situations which provoke compulsive rituals. As Rachman et al. (1973) conclude ".....in our opinion the most difficult patients to treat ..... are those with repetitive pervasive checking rituals, involving 50-100 checks every day, in a large variety of situations. The patients with the best prognosis appear to be those with contamination fears and washing rituals focused upon a restricted number of stimulus situations" (p. 470).

Overall then, taking into account a few of the above cited qualifications, either modelling, flooding or a combination of the two treatments appear to be at present the most efficacious methods of treating at least one type of this complicated disorder. It is probably important to note that as none of the three methods has been shown to be really superior to the others, the prospective therapist may choose the form of treatment that he feels will be least stressful to his patients.

The theoretical formulation of obsessive-compulsive neurosis based on anxiety/drive reduction theory and the subsequent approaches to its treatment do not exhaust the behavioural techniques that have been applied to this disorder. Apart from the strikingly different approaches taken with obsessional ruminations (to be described), some isolated techniques have been reported and will be mentioned very briefly here. These include 'modification of expectation', a technique described by Meyer (1966) and one which has many similarities to the flooding procedures in practice if not in theoretical explanation; discrimination learning and reinforcement of decision making (Mather, 1970); and the use of operant reinforcement procedures (Bailey & Atchinson, 1969; Yen, 1971). While there are some interesting ideas presented in these case studies, they do not warrant an extended discussion at this point as the number of reported cases is very small and as the theoretical analyses of the cases, treatments, and results are quite limited.

Treatment of Obsessional Ruminations

As noted (Rachman, 1971) obsessive ruminations have been excluded from studies on flooding and modelling. Although obsessive ruminations are considered an obsessional disorder (Yates, 1970) approaches to its modification have been quite different from the previously described treatments. Two particular treatments that have evolved for dealing with them are electrical aversion therapy and thought stopping.

Electrical Aversion

The first use of electrical aversion therapy is described by Wolpe (1958). He had patients clearly imagine their obsessive thoughts and raise their finger when they had done so. Raising of the finger was followed by a painful electric shock which was terminated when the subject lowered his finger indicating that he could not bear the shock any longer. Wolpe only described one case in detail, a woman with a 'food obsession', and the method appeared to be successful in reducing the obsessive brooding about food. Three other cases are mentioned, one having achieved moderate success, one slight success, and one which failed to improve.

McGuire & Vallance (1964) also described the treatment of a case of obsessional ruminations in this manner apparently with good success. Their method differed from Wolpe's, however, in that after the first session the patient was given his own shock apparatus and asked to deliver the punishment by himself when the ruminations came to his mind. Kushner & Sandler (1966) describe the successful treatment of a case of suicidal ruminations using Wolpe's technique. Mahoney (1971) approached the problem in a similar fashion. However, instead of electric shock he had the patient punish himself by flicking a large rubber band attached to his wrist each time an obsessional rumination came to his mind. This study also differed in that positive thoughts were systematically reinforced through self-administered rewards.

Thought Stopping

Thought stopping has been applied to obsessional ruminations in a similar fashion (i.e. with a punishing stimulus). In this technique the patient is asked to re-imagine an obsessive thought and after he has obtained it clearly, the therapist suddenly shouts (STOP" and sometimes makes a loud noise at the same time. With repetitions he tries to demonstrate to the subject that this procedure does drive out the thought at least temporarily. The therapist then instructs the patient to use the method himself by shouting 'stop' in his mind each time he experiences an obsessive thought. Some back-up sessions are provided by the patients.

This technique has been described in detail by Wolpe and Lazarus (1966) and positive results in single instances have been reported by Stern (1970) and Yamagami (1971). The first controlled trial has been reported by Stern, Lipsedge & Marks (1973). Eleven patients were treated with thought stopping and relaxation training in a cross-over design. Only four of them experienced what can be considered as definite improvement resulting from thought stopping and consequently the effectiveness of this technique has not been adequately demonstrated. The authors suggest that the over-all lack of efficacy could have arisen from the fact that a limited number of treatments was given and that treatment was given by tape recording, so a final judgement must presently be reserved.

The Nature of Obsessional Ruminations

The focus of this thesis is a consideration of obsessional ruminations. Rachman (1971) describes them as "repetitive intrusive and unacceptable thoughts. They may be distasteful, shameful, worrying or abhorrent or a combination of all these characteristics. In content, they generally comprise thoughts of harming others (particularly relatives or children), causing accidents to occur, swearing or distasteful sexual or religious ideas (p. 229)." To this definition we may add the quality of internal resistance (Mayer-Gross et al., 1954) as obsessional patients, while recognizing ruminations as their own thoughts, feel that they come against their will and consequently resist them, usually unsuccessfully. Rachman (1971) believes that patients with obsessional ruminations also engage in surreptitious avoidance behaviour such as hiding sharp objects, keeping their hands in their pockets, refraining from driving or even remaining housebound in some extreme cases.

In the present context it is important to consider the question of whether obsessional ruminations or ruminative-like thoughts are present in other types of obsessional disorder and if so, whether they have any importance in the genesis and maintenance of the disorder.

Many authors have given an 'ideational' explanation for the nature of obsessional disorders. For example, as mentioned, Worsley (1970) describes patients as behaving as if there were a threat that they will not act in a certain

way'. This type of explanation, although stated in an 'as if' manner, implies that obsessional patients think about possible future events and engage in ritualistic behaviours as a result of these ideas (cognitions) rather than strictly as a result of overt behavioural events.

These types of ideational hypotheses are, however, too global for a specific analysis of the mechanisms underlying obsessional behaviour. While they appear to engender an understanding of the behaviour, they do not lead to specific postulations about selective modes of action for ideational processes.

Obsessive Ideation

The present thesis takes the position that ideations are present in obsessional disorders, that they are rumination-like in character, and that they play an important functional role in the genesis and maintenance of obsessional disorders of all types.

The author has stated elsewhere (Kenny, Solyom & Solyom, 1973) that reports have been obtained from obsessive-compulsive patients describing the presence of ruminative-like thoughts which seem to share all the characteristics of ruminations (as previously described). The term 'obsessive ideation' was coined to refer to these thoughts in general, regardless of the nature of the remaining symptom pattern.

Obsessive ideations appear to incorporate any or all of the following types of cognition: 1) obsessive images; 2) obsessive thoughts or ideas (verbal); and 3) obsessive

memories in the visual or auditory mode. An example of the first type, obsessive images, is illustrated in a case seen by the author, in which a young woman repeatedly experienced the image of an erect penis. Another case involved a man who continuously had a series of pictures of his wife in bed with another man. Interestingly, although images are often sequential, they are reported by patients as being like 'single-frame shots' rather than like a moving picture.

Verbal obsessive thoughts and ideas refer to unwanted intrusive cognitions which appear to occur in a verbal mode, that is, the thoughts come like words and phrases. Most of the descriptions of ruminations quoted from Rachman above are examples of this type. They occur in other obsessional disorders in a similar fashion and are often chained. A young woman with contamination fears and compulsive washing rituals described constantly present thoughts such as "There may be urine on the toilet seat; I may have accidentally touched it; I may have touched the table with it; I might have contaminated someone (a member of the family), etc."

A qualification must be made at this point; while most patients seem to describe their obsessive ideations as images or verbal thoughts, there are some for whom neither category seems to fit. These patients appear to have ideations in the nature of conceptualizations which do not fit either description. In dealing with these patients the author has obtained some success by combining images and verbal phrases (in the treatment to be described).

Finally, some patients experience obsessive memories, usually in the form of images but not always. One patient was continuously obsessed with 'seeing himself' at his brother's funeral which had taken place many years before. Another patient could 'hear as if she were here now' her mother's words about how much good there was in a single drop of cleaning water.

The fact that obsessive ideations can be discussed in three separate categories does not mean of course that the boundaries never overlap nor that combinations do not occur. This does happen but the author's experience suggests that there is usually a dominant mode.

There will probably be little argument whether such ideations exist. What characteristics they share with ruminations and what forms they take is something which needs to be decided by careful study. The main problem, however, appears to be in establishing what role they play in the obsessive-compulsive complex of symptoms. Two main alternatives present themselves. First these ideations may simply be an expression of attitude, a rationalization of behaviour which has arisen as a result of overt action. If this is so, then when the behavioural aspects of obsessive neurosis are changed for the better, there should be a corresponding change in ideations. There is evidence in the studies by Rachman and his co-workers that attitudes toward the distressing stimuli and concepts of obsessional behaviour do change in obsessional patients as a result of successful treatment. These changes

do not necessarily reflect changes in obsessive ideation as it is being described here, however (i.e. as a symptom and as the target of treatment). It will be of critical importance to assess this change in future studies as far as this theoretical stand is concerned.

The second possibility, which is offered in this study, is that obsessive ideations play a functional role in obsessional disorders. At present this hypothesis can only be indirectly supported with evidence that modification of these ideations leads to changes in behaviour (Kenny et al., 1973; Kenny, in preparation). However, it seems that some postulation of the nature of this mechanism is necessary at this point.

Two possible modes in which obsessive ideation might be involved in the functional nature of obsessive neurosis will be discussed here. First, if, as Bandura (1969) suggests, avoidance and autonomic behaviour may be independently elicited and fixated to the phobic stimulus, then we might assume that the same would be true of obsessive ideations--hence they could be viewed as covert responses to fear-provoking stimuli. It might be further assumed that such responses when fixated as in compulsive behaviour, may serve as stimuli which could then provoke additional autonomic responses (anxiety). This approach assumes that covert obsessive ideations will obey the same laws of behaviour as do overt responses.

It would then be expected that just as compulsive (avoidance) behaviours reduce in response to habituation of

the anxiety-eliciting cues, so should obsessive ideations. On the other hand, if, as Bandura (1969) further suggests, chronic cases are harder to treat because compulsive behaviours have become conditioned to a large number of cues through stimulus generalization, then it might be assumed that the same situation applies to obsessive ideations.

This formulation would not suggest that a direct treatment attack on obsessive ideations would be of any therapeutic value unless it is assumed that obsessive ideations can also become functionally autonomous and capable of eliciting avoidance behaviour (as Walton and Mather (1963) have suggested for ritualistic behaviours). Even if that assumption is made, however, then such an approach would only be warranted in chronic cases.

Obsessive Ideations as a Functional Entity

A second possibility as to the role of obsessive ideations suggests itself, however. This is that in the genesis and maintenance of obsessional behaviour, ideations might serve to 'bridge logical gaps' which occur between phobic stimuli and subsequent ritualistic behaviour.

It was mentioned earlier in the discussion by Worsley (1970) that confusion may arise in the analysis of ritualistic behaviour because such behaviour may be either escape or avoidance behaviour. It was noted that obsessional patients thus differed from phobic patients in the logical relation of their behaviour to the provoking stimulus. Taking this a step further, it appears that in many instances of obsessive

neurosis, the distressing stimulus is undetectable and unavoidable. Particularly in cases of contamination fears coupled with washing rituals, the stimuli are usually small amounts of excreta, various chemical substances, viruses, cancer, small pins and pieces of broken glass, etc. These have the common characteristic of being relatively undetectable to the naked eye (or touch) and are therefore unavoidable through ordinary means.

Now if it is assumed that such fears are learned (e.g. through strict parental training) it must also be assumed that all of the following are learned: a) that minute amounts of these substances can be present (i.e. on the hands following urination); b) that washing will get rid of visible dirt, etc; and c) that washing will get rid of the undetectable traces as well. Both a and c are ideations and it can be stated, therefore, that these are examples of learned ideations which serve to bridge the logical gap between behaviourally illogical events (trying to wash off something which cannot be detected).

Even if this formulation is accepted, it does not explain why obsessionals wash more than once after encountering the phobic stimulus. Many non-obsessional people have gone through the above-cited learning experience and are satisfied to wash once following contact with urine, for example.

Three possible explanations for the repetition of washing present themselves. The first is that obsessional patients may have responded with a far greater degree of

anxiety than have most and that the large amount of subsequent anxiety-reduction is the crucial variable. While this might explain why washing behaviour is strongly conditioned to the cue, it does not explain why washing occurs more than once. The second explanation would be that a high degree of anxiety is present but that single washings result in only small decrements in that drive so that several repetitions are necessary before an adequately low level is achieved.

This latter suggestion, while explaining the repetition of the ritualistic responses, does not explain why the washing is restricted to particular body areas (usually the hands and forearms) nor why particular rigid sequences are followed. These latter processes can only be understood if it is assumed that ideations arise which not only act as stimuli for anxiety but also direct the location of possible contamination and even further, which suggest that certain sequences of washing are safer than others. Thus many obsessional patients state that they doubt whether all the substance has been eliminated, that it may have spread to other parts of the body, that they may have touched the walls or clothes with it before it was gone, that some may still be on the toilet seat, etc. These types of ideations may indeed serve to initiate a great deal of ritualistic washing and cleaning behaviour. It seems quite reasonable that these ideations which either fail to habituate (as Rachman, 1971, suggests for ruminations) or become fixated in some other manner (anxiety-reduction) serve as strong

stimuli for subsequent washing behaviour. Such ideations also serve as mentioned to bridge the logical gaps between the physical stimulus and subsequent overt washing behaviour.

One further point must be made. It seems very unlikely that all the ideations (doubts) described above, particularly the ideational chains of consequences, would have been acquired from others. Therefore, it can only be assumed that they have been covertly generated in some fashion, although they can be and may always be a logical extension of a previously learned idea. For example, it is learned that traces of a substance may remain even though unseen but the covertly generated extension of this (that it may have spread, etc.) is what characterizes the obsessional.

The crux of understanding obsessional neurosis may be then in discovering why and how such ideations arise and subsequently become fixated. While an explanation in terms of environmental learning cannot be ruled out, some consideration must be given to causes relating to a) personality traits, and b) previously learned cognitive sets or styles.

The above formulation has been given for the contamination fear/compulsive washing type of obsessional patient. The same analysis can be applied to other types of obsessional behaviour, and in particular to patients with ritualistic checking behaviours whose main complex of symptoms often centres around obsessive ideations in the form of doubts (e.g. have I really turned off the stove?).

In summary then, the following points have been suggested concerning obsessive ideations: a) although they bear a direct relationship to overt cues, they represent a process of ideational learning; b) they serve in these instances to bridge logical gaps between physical cues and subsequent overt compulsive behaviour; c) they may be covertly generated extensions of previously learned ideations; d) they serve as stimuli for autonomic arousal and overt behaviour independently of the original cues at times; and as such e) they may like overt behaviours become independently fixated.

Modelling and flooding have been shown to improve obsessional behaviour (as mentioned). It is not unlikely that such procedures may also initiate changes in obsessive ideations, a postulation which may account for the fact that many patients continue to improve beyond the termination of treatment. On the other hand, strongly fixated or particularly intractable ideations might account for many of the therapeutic failures.

Resistance

Unfortunately, the question of the nature of obsessive ideations must be complicated one step further. This stems from the observation (Mayer-Gross et al., 1954) that most obsessional patients view their obsessive ideas and ruminations as foreign, silly, etc. and strongly resist them.

Although Walker (1973) suggests that resistance should not be used as a criterion for the diagnosis of obsessive disorders, as many patients do not report this phenomenon, the fact remains that many other, if not the majority of patients, do have this particular experience. Thus some

explanation of the inappropriateness of the ideas and the patients' attempts at resistance seems necessary.

The repugnance, silliness, etc. associated with an obsessive ideation must necessarily vary with the patient's previously learned response to its content. As Walker points out it would be possible to have obsessive ideation which is not distressful. Thus the feeling associated with the obsessive ideations should show considerable variance from patient to patient. This feeling will be compounded, however, by the fact that through conversation and observation of others, the obsessional patient learns that others do not behave as he does nor do they report the same thoughts. If, as a result of these two processes, the valence associated with the obsessive ideations is highly negative, then the patient will resist them.

As regards the phenomenon of resistance itself this may be given an operational definition as follows: A patient will describe himself as resisting an ideation when he engages in overt behaviour which, it has been previously learned, cannot co-exist with elaborate trains of thought. Thus such acts as performing simple overt tasks, working, speaking, etc. are common behaviours which make thinking difficult if not impossible. Obsessive patients will then tend to engage in such behaviour to try and eliminate the obsessive ideations. When these and possibly newly-generated methods fail to achieve this end, the patient will state that he is unsuccessfully resisting.

Obviously these are not easily described and analyzed problems. The nature and role of obsessive ideations can only be vaguely speculated on. On the other hand, it is the purpose of this thesis to provide some justification for the formulation, by establishing whether or not a direct threapeutic attack on obsessive ideations results in therapeutic progress being reflected in an overt change in behaviour as well as in the subjective obsessive experience.

Conditioning of Ideations

As it has been found that electrical aversion therapy has produced marked changes in obsessional ruminations (see previous discussion) it appears logical to assume that other obsessive ideations can be approached in the same manner.

The application of an aversive stimulus to mental phenomena was first examined in detail by Marks & Gelder (1967). They found that the punishment of mental images of fetish objects resulted not only in the reduction of these images (in terms of frequency and severity) but also in a large reduction in the frequency of overt fetish behaviour which persisted for over two years (Marks, Gelder & Bancroft, 1970). Perhaps even more important than these observations was that for the first time changes in imagery were studied systematically. The main piece of data collected in this regard was the latency of image formation. When the patient was asked to reproduce an image in his mind, the time that elapsed between the instructions and the point at which the patient raised his finger to indicate that he had the image

clearly was recorded. This 'latency of image formation' was observed to increase over sessions when the aversive paradigm was applied (Marks & Gelder, 1967). In many cases, the latency of image formation increased to the point that even when up to three minutes were allowed, the patient could no longer conjure up the images.

These observations coupled with the observations on the effects of electrical aversion on obsessive ruminations led to a proposal that a similar effect could be achieved in obsessive-compulsive patients (Kenny et al, 1973).

An initial success in eliminating compulsive vomiting in one patient (Kenny & Solyom, 1971) led to a pilot study on a treatment for obsessional patients (Kenny et al., 1973). This study was performed essentially backwards to the current formulation in that the compulsive behaviours were treated first. This was done for two reasons: first, the authors wished to know if compulsive behaviours could be modified through imaginal presentations as in the previously mentioned case and secondly, the authors wished to assess the resulting effects of removing this behaviour on obsessive fears and ideations.

It was found that the technique did in fact cause a great inhibition on the part of the patients to carry out their rituals and it was observed that in some cases this produced very distressful results. One patient reported after fifteen sessions that she was becoming more and more anxious because she still had a terrific urge to check the gas and

other devices but she could not bring herself to do so because of the treatment. This put her in a terrible quandary and a list of obsessive ideations was quickly made up and the treatment applied to these. This appeared to shortly rectify the problem in that the urge to check subsided gradually.

The results of the treatment carried out on five patients (Kenny et al., 1973) were that three were greatly improved, one moderately improved and one patient developed psychotic delusions after the complete removal of her obsessions.

These initial successes were followed by further successes with additional patients treated over a two-year period. It subsequently appeared reasonable that a controlled trial should be instigated.

Faradic Disruption Treatment

Electrical aversion therapy as applied by Marks & Gelder (1967) appears to follow a straight forward punishment paradigm as the occurrence of mental images is swiftly followed by a painful stimulus. The method used by this author is not so simple because patients are instructed that when they obtain their images or thoughts they are to keep their finger raised as long as they can hold the images in their mind. This would appear to resemble an escape paradigm as the shock is terminated when the finger goes down indicating that the image has disappeared. On the other hand, patients are requested not to deliberately escape the situation but to force themselves to keep the images in their mind despite the shock

until the image 'blinks' out, in a sense without their conscious effort. Patients do not appear to mind doing this even though in essence they are punishing themselves.

This particular procedure was designed to be different from that of Marks and Gelder as it was felt that additional therapeutic value might be obtained by making the termination of shock contingent on changes in mental imagery rather than purely on patients' tolerance of the aversive stimulus. Thus it was hoped that situations where the shock could not be further tolerated but where the mental image was still present, would be better avoided.

As the nature of this paradigm is unclear at the present, a temporary term 'faradic disruption' has been coined to refer to the procedure and is deliberately intended not to make any implications as to the nature of the treatment other than viewing it as an aversion type of therapy. Marks (1968) has used the term 'experimental repression' but the present term is preferred as it makes no assumption about the mechanism whereby the procedure achieves its effects.

In the present investigation, obsessive ideation is the target for treatment with faradic disruption. However, in some cases where compulsive acts are long-standing, they may be treated as target symptoms but only subsequent to the completion of treatment of obsessive ideation.

SECTION II

THE CONTROLLED TRIAL

Aim

The aim of the present study was to test the following hypotheses, which were derived from the previous study (Kenny et al., 1973):

a) that improvements in target obsessive-compulsion symptoms are a direct result of the application of Faradic Disruption of Obsessive Ideation;

b) that the application of Faradic Disruption results in increases in the latency of image (thought) formation of treated obsessive ideations over the treatment sessions;

c) that improvements in untreated obsessive-compulsive symptoms accompany changes in treated symptoms;

d) that improvements in obsessive-compulsive symptoms result in an overall improvement in patients' general adjustment to life situations; and

e) that the effects of Faradic Disruption of Obsessive Ideation remain relatively specific to the obsessive-compulsive neurosis and do not extend to general trait anxiety or anxiety responses to other situational events.

Method

Groups

Two groups of subjects were designated for the present study. An experimental group was to receive 30 sessions of Faradic Disruption of Obsessive Ideation over a three-month period while a control group was to receive three months of

conventional psychiatric treatment (drugs, psychotherapy, etc.).

Due to a general reluctance on the part of referring physicians to give conventional psychiatric treatment for a three-month period when a behaviour modification treatment was available, the control group had to be changed to a waiting-list control group (c.f. experimental design).

Despite earlier indications, it was also found that large numbers of patients with obsessive neurosis were not readily available so that a final total of six patients comprised the faradic disruption group and four comprised the waiting-list control group (c.f. selection and matching of subjects).

Selection of Subjects

Subjects diagnosed as having an obsessional neurosis were admitted to the study provided that they met the following criteria:

1) that at least one major obsessive-compulsive symptom was present and that it was the dominant complaint;

2) that no other psychiatric illness which may be considered an organic psychosyndrome or a functional psychosis was present;

3) that the patient had a history of the main obsessional complaint for no less than two years.

No patient was rejected on the basis that he presented other neurotic symptoms provided that all the other criteria

were adhered to. Furthermore there had to be an agreement concerning each of the criteria on the part of the referring psychiatrist; an independent psychiatric resident who also served as a blind assessor in the study, and the present author.

Eight subjects were initially admitted to the Faradic Disruption group. However, two of these had to be excluded for the following reasons. One patient terminated treatment after 13 sessions of Faradic Disruption because he felt that the therapy was too stressful, despite the fact that he had rated himself as already much improved. A second patient who also rated herself as considerably improved after ten treatments was deleted from the study when it was discovered that her psychotropic medication had been increased to the point where she was ataxic and actively hallucinating.

Consequently the present total of six patients was included in the Faradic Disruption group. No patients terminated or were terminated while in the waiting-list control group.

Thus a final total of six patients comprised the Faradic Disruption group while four patients comprised the waiting-list control group. A brief description of these ten subjects is presented in Appendix A.

Matching of Subjects

An initial attempt was made to match patients as they were admitted to the study.

The criteria for matching were as follows:

1) age (+/- 5 yrs.)

2) sex (male/female)

3) length of present illness (+/- 5 yrs.)

4) type of major obsessive symptoms

i) rumination/fear only

ii) rumination/fear accompanied by compulsion

iii) compulsion only

The first referred patient was automatically placed in the Faradic Disruption group. Each subsequently referred patient was also placed in the Faradic Disruption group unless he matched a patient already in the group. Thus the control group was added to only when matches were found. All matching was on the basis of information received from the referring physician and was carried out prior to the patient's initial interview for the study.

It was subsequently found that the four control patients were adequately matched with four Faradic Disruption patients with respect to age and length of illness, but not with respect to sex or to type of disorder.

Table 1 presents the patient characteristics for the four matched subjects in each group.

As can be seen in Table 1 mean age and mean length of illness are closely matched. One of the matched pairs was of opposite sex, however, and although there are identical numbers of patients with each type of disorder, this did not arise from a true matching.

TABLE 1

Characteristics of Matched Patients

	Faradic Disruption		Control	
	$\bar{X}$	S.D.	$\bar{X}$	S.D.
N	4		4	
Mean Age (yrs.)	28.50	11.2	29.25	9.5
Male/Female	1/3		2/2	
Length of Illness (yrs.)	7.25	5.7	7.50	3.0
Type of Disorder				
Rumination only	1		1	
Rumination + Compulsion	3		3	
Compulsion only	0		0	

A one-tailed t-test applied to mean age and length of illness showed that the two groups did not significantly differ in these respects (t=0.077 and 0.073, respectively).

Table 2 shows how the characteristics changed with the inclusion of two unmatched patients in the Faradic Disruption group.

The Faradic Disruption group now had a greater mean age and length of illness than the control group, but a one-tailed t-test shows that these two differences are not significant (t=0.387 and 0.436, respectively).

As the bias appeared to favour the control group, in that they are younger and have less lengthy illnesses, it was decided that the two extra Faradic Disruption patients could

be safely included in the data without introducing a positive bias in favour of the experimental hypotheses. Correspondingly, sex and type of disorder, while not particularly disproportionate, were left as uncontrolled factors.

TABLE 2

Characteristics of Patients by Group

	Faradic Disruption		Control	
	$\bar{X}$	S.D.	$\bar{X}$	S.D.
N	6		4	
Mean Age (yrs.)	40.67	20.8	29.25	9.5
Male/Female	2/4		2/2	
Length of Illness (yrs.)	16.67	18.0	7.50	3.0
Type of Disorder				
Rumination only	2		1	
Rumination + Compulsion	4		3	
Compulsion only	0		0	

Experimental Design

Table 3 presents the general experimental design for the study.

For both groups, preliminary assessments were taken immediately following a patient's acceptance into the study. Faradic Disruption patients received treatment two to three times a week over a three-month period until a total of 30 sessions had been reached. During the course of treatment,

TABLE 3

General Experimental Design

Faradic Disruption	Initial Assessment N=6	Assessment after 10 Treatments N=6	Assessment after 20 Treatments N=6	Assessment after 30 Treatments N=6	Additional Treatment or Follow-up
Control	Initial Assessment N=4	1 Month Assessment N=3	2 Month Assessment N=3	3 Month (Final) Assessment N=4	Faradic Disruption instituted

assessments were made after the 10th and 20th sessions, respectively, and a final assessment was made at the end of 30 sessions.

The number of treatments (30) in the experimental design was arbitrarily determined on the basis of the pilot study which suggested that most of the major changes resulting from Faradic Disruption would take place during that time.

Waiting-list control patients were contacted for additional assessments after one and two-month periods, roughly corresponding to the within-treatment assessments of the Faradic Disruption group. One waiting-list control patient refused to take these assessments, insisting on coming again only when treatment could begin. Consequently, data are available on this patient for only the initial and final assessments. A final three-month assessment was given to correspond to the final treatment assessment.

In cases where a full 30 treatments were not required by a Faradic Disruption patient, he was given a once weekly booster treatment until he reached the end of the three-month period, at which time the final assessment was given. In this manner the assessment intervals for the two groups were still roughly equal.

In some cases, Faradic Disruption patients required more than 30 treatments before they could be clinically discharged. Although this does not affect the results obtained during the experimental period, it does affect the follow-up results. In these cases, follow-up assessments were not

initiated until treatment had been completed. Thus for some of the patients the follow-up period began after the final (30 treatments) assessment while in others it did not begin until later.

The control group was given Faradic Disruption treatments beginning immediately after the final (three-month) assessment following which they were assessed in the same manner as the original Faradic Disruption group.

Follow-up assessments were scheduled for 1, 3, 6, 12, and 24-month periods following completion of treatment for both the Faradic Disruption patients and the control patients who eventually completed Faradic Disruption treatment.

All treatments were carried out on an out-patient basis with two exceptions. One patient, who was subsequently excluded from the study due to side effects of increased medication, and another patient in the Faradic Disruption group, were admitted to hospital, primarily due to the fact that they were from distant places and the hospital was a convenient place to stay. In the case of the patient who was included in the study, it was ensured that no other treatments were given concurrently to the present one.

Finally medications were permitted provided they met two criteria: a) that they were of a fairly low dosage; and b) that they had been regularly taken for a year prior to treatment and could therefore be considered as maintenance doses. Otherwise medication was either dropped or, as in one case, the patient was excluded from the study. In most cases

medication, when taken, consisted of minor tranquillizers.

Psychometric Assessments

For all treatment assessments, including follow-up, the following battery of measures was used:

a) patients' subjective rating of their symptoms

b) IPAT Self-Analysis Questionnaire

c) Fear Survey Schedule

In addition the initial and final treatment assessments included a blind psychiatric evaluation on:

d) patients' symptoms

e) patients' general adjustment

Test Descriptions

a) Patients' subjective rating of symptoms: During the initial interviews, the patient's obsessive-compulsive symptoms were listed and the patient selected one as a target symptom for treatment. All the listed symptoms were then written down on a rating sheet designed for the experiment (see Appendix B). Each symptom was written down at the side of an arbitrarily chosen 105 mm. line (4 inches) which was to represent the symptom from 'absent' to 'most severe'. It was explained to the patient that this upper limit was to signify 'the worst that the symptom had ever been'. The patient was then asked to make a judgement of his symptoms, as they were presently in terms of frequency and severity, and to rate them by placing a stroke through the line at the point he felt best represented each one. A stroke at the absent end of the line (scored 0) meant that the symptom was

no longer present while a stroke at the opposite end (scored 105) meant that the symptom was now as bad as it ever had been. For intervening points the distance of the stroke in mm. from the absent end of the line was used as the raw score for any particular symptom.

b) IPAT Self-Analysis Questionnaire (Cattell & Scheier, 1963): This test was given to the patient to complete and was scored in the conventional manner. The raw score was used for the study and was not converted to sten scores. This test was taken as a measure of trait anxiety.

c) The Fear Survey Schedule (Wolpe & Lang, 1964): This test was given to each patient to complete and was scored for the present experiment by allocating a score of 4 to each item rated 'very much', 3 to each item rated 'much', 2 for 'somewhat', 1 for 'a little' and 0 for 'not at all'. A total score was then computed as the sum of all these values and used as a measure of general situational anxiety.

d) Psychiatrists' Rating of Symptoms: The list of symptoms used in the patient subjective rating was written down on another sheet (see Appendix B) and given to a psychiatric resident who was not aware of the group that each patient was in. After examining the patient he rated each symptom from 0-10 (based on frequency and severity). A rating of 0 was taken to indicate a complete absence of the symptom, while 10 meant that the symptom was as frequent and severe as it had ever been. These scores were recorded beside each item and the resident did not have access to the pre-treatment

rating when he completed the post-treatment rating.

e) Psychiatric Rating of General Adjustment: This index was patterned after that of Gelder, Marks & Wolff (1967) and was intended to provide an indication of the amount of impairment that resulted from the obsessional neurosis in the patient's work, social relationships, family relationships, sexual relationships and leisure activities. In discussion with the patient, the resident recorded the level of impairment shown by the patient in each of these areas; 0 indicating no impairment; 1, mild impairment; 2, moderate impairment; 3, severe impairment; and 4, total impairment. Summing the scores in each category produced a general adjustment index for each patient. A description of the rating form and the instructions can be found in Appendix B.

Latency of Image (Thought) Formation

In addition to the rating scales and psychometric tests, an analysis of the previously discussed latency of image (thought) formation was undertaken. This measure is conventionally taken with the presentation of each item during Faradic Disruption treatment and consequently a complete record is available for each patient who receives this treatment. However, as it was necessary to compare the two groups in this investigation, the design outlined below was followed.

During the initial interviews for each patient a list of 10 images or thoughts (obsessive ideations) concerning the target symptom was selected for treatment (to be described

in detail below). This applied equally to the Faradic Disruption and control groups, however, during the experimental period only the images of the patients in the Faradic Disruption group were subject to the aversive treatment (also to be described below) while no treatment was given to the control group.

In addition a list of 10 neutral ideations was derived by taking the first 10 items on the Fear Survey Schedule (F.S.S.) which were rated 'not at all' and which gave a specific image. In some instances the F.S.S. item had to be partially changed, e.g. journey by train was changed to simply imagining a train. If 10 such images could not be derived due to high ratings on most of the F.S.S. items, then the remaining number was taken from the following list (a house, a tree, a flower, a cow, a horse) provided the subject indicated that each one used provoked no particular anxiety.

The patients were then asked, during the assessment periods, to imagine each of the ten items in each of the two lists. This was done by having the patient sit with his back to the experimenter and receive the following instructions: "Do not start imagining until I finish reading out the item to be imagined. Raise your index finger as soon as you visualize each one clearly.".

A stop watch was started as soon as the item was read out in the following fashion: "Clearly imagine _____" (a train; yourself crossing a street, etc.), and was stopped the moment the patient raised his finger. A 30-second

interval was given between each item. The time that elapsed between the completion of the instruction and the raising of the finger was recorded as the latency of image (thought) formation for each item. A mean latency was later calculated for both obsessive and neutral ideation lists. Latency of image formation was recorded at the initial assessment, after 10 treatments (or one month control), after 20 treatments (two months control) and at the final assessment.

Treatment

Faradic Disruption of Obsessive Ideation

Faradic Disruption refers to the application of an aversive stimulus to images and/or thoughts that patients have concerning their obsessive symptomatology: hence, Faradic Disruption of obsessive ideation.

Prior to the first session, each patient selected a target symptom and in consultation with the patient, a list of all the obsessive ideations concerning that target symptom was obtained. Next the patient was asked to select the ten (ideations) he considered to be most troublesome on the basis of their frequency and severity and also on the basis of how central each was to his target symptom. In some cases the list was arranged sequentially; that is, there was a step-wise progression from one item to the next. Table 4 presents an example of such a list in the case of a woman who was obsessed with the idea that she was responsible for her mother's death. The obsession was coupled with the compulsion to visit her mother's grave in every free waking moment.

TABLE 4

Sample List for Faradic Disruption - Sequentially Arranged

1.	(image)	You and your mother out walking for the last time
2.	(image)	Your mother falling down
3.	(image)	You staying there and not going for help
4.	(image)	Looking at your mother lying on the ground
5.	(image)	Seeing mother in coffin at home
6.	(image)	Being in church at the funeral
7.	(image)	Being alone in graveyard after the funeral
8.	(image)	Seeing mother's face in bedroom window
9.	(image)	Mother's face being very ugly
10.	(image)	Mother's face coming towards you

In other cases the list was more haphazard and little sequence was evident. Table 5 presents an example of such a list in the case of a woman who feared that failure to perform certain house-cleaning rituals would lead to her sons going blind.

In constructing all lists, the most important criterion was that the patient felt that the images and/or thoughts on the list represented the core of his ideations about the target obsessional symptom.

In some cases additional lists were made. These were either other ideations about the target symptom or a

list of ideations about the target symptom or a list of ideations about other troublesome symptoms. These lists were not used for treatment until both the patient and therapist were satisfied that the first list had been adequately dealt with (to be described).

TABLE 5

Sample List for Faradic Disruption - Not sequentially Arranged

1.	(thought)	Don't put those sheets on because something may happen to the boys
2.	(thought)	The boys may go blind
3.	(thought)	Iron the sleeves again or something might happen
4.	(thought)	I might go blind because I can't see well now
5.	(thought)	Wash your hands or your boys will be blind
6.	(thought)	Take the sheets off or something will happen to your boys
7.	(thought)	Wash the cups over again or your father will go blind
8.	(thought)	Ring the wash through the ringer again or something will happen to the boys
9.	(thought)	I have to pin the clothes on the same way every time
10.	(thought)	Press the pants over again or something will happen

After the first list had been satisfactorily designed, the individual sessions were begun. In each session the patient was seated with his back to the therapist and finger electrodes were attached to the finger-of-choice on the right hand. A sensation threshold was then determined by electrically stimulating through the electrodes using a variable amperage shock generator with a maximum level of 20 milliamperes.

After the sensation threshold was determined, the shock was slowly increased to a pain threshold intensity which was indicated by the patient saying that the point was reached at which he could not tolerate a greater intensity. The shock level was then reduced slightly and the session begun with the presentation of the first item on the treatment list.

Each item was presented in the following manner. The therapist began by saying "Clearly imagine _____ (the item)." The patient was previously instructed to raise the index finger on his left hand when he could clearly obtain the image (usually a couple of seconds). As soon as the instructions were stated, the therapist began his stop-watch and recorded the time that elapsed from that point to the point at which the patient first raised his finger.

The patient was previously instructed that when he raised his finger, he was to keep it raised just as long as he could keep the image in his mind. He was told to per-

severe and try hard to keep the image (or thought) despite any shocks he would receive. Then when the image did 'disappear' (or 'blink-out' as many patients described it), he was to immediately lower his finger at which point the shock would cease.

When the patient raised his finger, the electroshock was immediately delivered at the previously adjusted level in a pulsating fashion (e.g. approximately $\frac{1}{2}$ sec. burst every second). In cases where the finger remained raised for more than 5 seconds, the shock was gradually increased until the image was disrupted; it was then returned to the previous level for the presentation of the next item. In addition, throughout the sessions, the patients were asked to indicate at any time if they felt the shock was too weak or too strong so that an appropriate adjustment could be made. They were also encouraged to take the shock as strongly as they could without making it unbearable. In each session the therapist and patient attempted to find a level of electroshock which when delivered resulted in a disruption of the image within 5 secs. of the patient raising his finger.

Each item in the list was treated in this fashion, with a timed 30 sec. interval between each one. Each item was presented in order (e.g. items nos. 1-10 successively) unless, as in some cases, the patient found the predictability boring or disturbing, whereupon a random presentation was given.

Sessions lasted between 30 and 45 minutes. At each session the list of 10 items was presented a minimum of twice and a maximum of four times, with three presentations being given in most instances. If the images were being conjured up very quickly (i.e. within 2-5 sec.) as sometimes happened in the initial few sessions, then four presentations were possible. In later sessions, when the images were taking 30-60 sec. to produce, sometimes the list could only be presented twice within the session.

After the first three presentations of the list (first session) in which a continuous reinforcement (CRF) schedule of shocks was used, a variable ratio (VR) schedule was introduced. This usually started at the beginning of the second session and the patient was told that he would not always get a shock when he raised his finger and that if the therapist said 'O.K.' when he raised his finger, he could immediately put it down and he would not get shocked. The VR pattern was used as follows: (S = shock; NS = no shock): S, NS, S, S, NS, S, NS, NS, S, NS, S, S, S, NS, S, NS, S, S, NS, S, NS, NS, NS, S, NS, S. (S = 13; NS = 12). This pattern did not correspond to any particular item so that over a large number of sessions the 13:12 ratio was maintained for each item.

Sessions were given at the rate of no more than three times per week and an attempt was made to space a day between each session whenever possible as it had been noted in the course of the previous study (Kenny et al., 1973)

that this led to a more regular rise in the latency of image formation.

As mentioned, Faradic Disruption was delivered for 30 sessions with the derived list of ideations. In some instances, however, either the following situations arose: a) the patient reached a point before 30 treatments at which he felt the ideations being disrupted were no longer exerting an influence on his behaviour; or b) he could no longer conjure up most of the images; or as was usually the case, c) he reported both.

In these instances one of the following procedures was initiated: a) if there were additional ideations to be treated, a new list was made up; b) if no new list was required (i.e. the patient was ready for termination) and he had reached or passed 30 sessions, then treatment was terminated; or c) if he had not reached 30 sessions, weekly booster sessions were given until a three-month period had been reached.

Thus the treatment procedure aimed at dealing with the patient in relation to changes that occurred during therapy so that the most satisfactory state was reached with each one.

Where treatment was continued beyond 30 sessions the follow-up period was not initiated until all treatment was completed.

Waiting-List Control Group

The initial assessments for the Faradic Disruption group and the waiting-list control group were identical in all respects. The control group was told that they would be delayed for three months before treatment was begun but that they would be seen once a month until the waiting period was over. When the control patients were seen once a month they were rated and encouraged to be patient, but a discussion of their problems was avoided as far as possible. They were, on the other hand, encouraged to continue taking their medication and seeing their referring physician if they so desired.

In the initial interview, they were given a full explanation of the treatment and its rationale as were the Faradic Disruption patients.

At the end of the three-month waiting period, they were given their final assessment after which time they began treatment if they still wished to do so.

Follow-up

At each follow-up session, in addition to making a rating, a discussion of each patient's adjustment was made along with any suggestions that could be provided. Patients were also told that they could take booster sessions if they wanted them. However, to date this request has not been made.

Clinical Results

Faradic Disruption

Eight patients originally comprised the Faradic Disruption group and, as mentioned, one patient voluntarily

dropped out and one had to be excluded from the study. Both of these patients had experienced some considerable improvement with the treatment.

Of the six patients who completed treatment, four considered themselves greatly improved, one considered herself only moderately improved and one felt that she had not improved with treatment. The five patients who improved did so steadily throughout the treatment sessions. It is interesting that the patient who failed to improve experienced two short periods of considerable improvement but relapsed after four or five days each time.

Three of the five improved patients required more than 30 treatments before discharge, one required less and received the once weekly booster treatments and one was terminated after 30 sessions exactly.

Waiting-List Control

All four patients in the waiting-list control waited for the full three-month period and all claimed that they had not improved with respect to their target obsessive symptom although some felt that they had experienced improvement in other respects (e.g. anxiety, minor phobias and obsessions).

All four patients decided to take Faradic Disruption treatment after the three-month period. One of these patients terminated after approximately ten sessions as she felt the treatment was not going to work and because she had noticed no improvement. This patient was particularly difficult to manage as she kept claiming she could not tolerate the shock

above the sensation threshold and consequently there was little to no change in the latency of image formation.

Another patient had to be terminated from Faradic Disruption treatment as it was found after three sessions that he could easily tolerate the maximum shock amperage without the slightest discomfort. Attempts to find other shock generators that he would find aversive failed. He was consequently advised to receive another form of treatment (modelling).

A third cross-over patient completed 30 Faradic Disruption sessions, took an additional ten treatments and then terminated considering himself considerably improved.

The fourth patient has only recently completed the three-month waiting period and no further data are presently available.

Follow-up

The five patients from the Faradic Disruption group and the one patient from the original control group, all of whom successfully completed treatment, were followed-up. The mean number of treatments required for discharge was 34.8 (S.D. = 10.1). The median follow-up period to date is three months. All six patients reported further improvement at one and three-month follow-up assessments. At six-month follow-up, however, two of the patients considered themselves as having relapsed. One of these was not a true relapse as the patient confessed at one year follow-up that she had not really relapsed but had rated herself as being so because she

was trying to get attention and action for a hysterectomy, which since she was only 21 years old and single, every physician she had seen had refused to give her. She subsequently settled down, no longer wished a hysterectomy and rated herself at the one-year follow-up as even more improved than at any previous period.

The one patient who experienced a true relapse of her symptoms, did so after approximately six months post-treatment. She claimed that the 'thoughts had been coming back more strongly' and she had recommenced with some of her ritualistic behaviour. The patient did not wish booster treatments, however, despite encouragement from the author and her regular physician. The reason for this was not because she had any aversion to treatment but because she still felt she had some control over the problems and wanted to see if she could regain the improvement on her own. She has not yet been seen for the one-year follow-up and no information has yet been received on how well she has progressed with her plans.

Summary of Clinical Results

Six patients completed the original Faradic Disruption sessions with four greatly improved, one moderately improved and one unimproved. Two of the four waiting-list control patients could not progress with Faradic Disruption treatment for various reasons while one successfully completed treatment and one has just begun. The mean number of sessions required for completion of therapy was 34.8.

Of the six patients who have successfully completed Faradic Disruption, all have been followed up with a median follow-up period of three months. Of the six, only one has what can be considered a true relapse. This patient declined booster treatments.

Experimental Results

All raw data on the previously described symptom ratings and psychometric tests were arranged by treatment groups for the four assessment periods. Means and standard deviations (presented in brackets) were calculated for each group for each observation.

Mixed model analyses of variance for repeated measures were performed on all data using the Balanova (1968) computer program. Details of any particular analysis are given in each sub-section below.

Because it was predicted that the faradic disruption group, in comparison with the control group, would show decreases in self-ratings of target and non-target symptoms, in psychiatric ratings of target and non-target symptoms, and in psychiatric adjustment ratings, F tests for simple main effects (Winer, 1962, p. 529-532) were applied to these data subsequent to the analysis of variance regardless of the overall significance of the main effects and interactions. For all other measures, subsequent F tests were applied only when significant analysis of variance results were obtained, and if necessary.

As discussed previously one of the control patients refused to attend for intermediate assessments so that data were available for this particular case only for the initial and three-month evaluations. An examination of the effects of including these scores in the analyses of results showed that they produced a considerable alteration in the pattern of the control group means. It was consequently decided to take the most conservative procedure and delete the results for this subject from the analyses involving the second and third assessments (with the exception of latency of image formation - see below).

Thus for analyses involving initial and final assessments the group members followed the original experimental format (N = 6 and 4) whereas when the within treatment assessments were used N = 6 and 3). The number of subjects is also altered in the analysis of latency of image formation and an explanation is given in detail in that sub-section (see below).

Patients' Subjective Rating of Target Symptoms

The scores for the selected target symptoms were directly taken from the patients' subjective ratings of their symptoms. Selection of the target symptom took place after the initial ratings of all symptoms. The remaining (non-target) symptoms are analyzed in a separate sub-section.

Table 6 presents the means and standard deviations for this rating.

The means from Table 6 are plotted in Figure 1, the numbers 1-4 denoting the assessment periods as per Table 6,

and show that there was a steady decrease in the ratings of the Faradic Disruption group over the four assessment periods while the control group ratings show some increase.

TABLE 6

Means and Standard Deviations for Patients' Subjective Ratings of Target Symptoms

		1	2	3	4
Assessments		Initial	10 Treatments	20 Treatments	30 Treatments
Faradic Disruption (N = 6)	$\bar{X}$	94.83	55.83	38.00	32.83
	S.D.	(12.05)	(31.94)	(33.44)	(33.20)
Assessments		Initial	1 Month	2 Months	3 Months
Control (N = 3)	$\bar{X}$	66.00	89.00	100.00	95.00
	S.D.	(24.54)	(12.03)	(7.07)	(9.09)

The analysis of variance which was performed on these data demonstrated a significant main effect for assessments and a significant interaction. A summary is given in Table 7.

For assessments, a test for simple main effects revealed a significant effect for the Faradic Disruption group ($F = 14.1271$, $df = 3/21$, $p < .01$) but not for the control group ($F = 1.96623$, N.S.) over the four assessment periods.

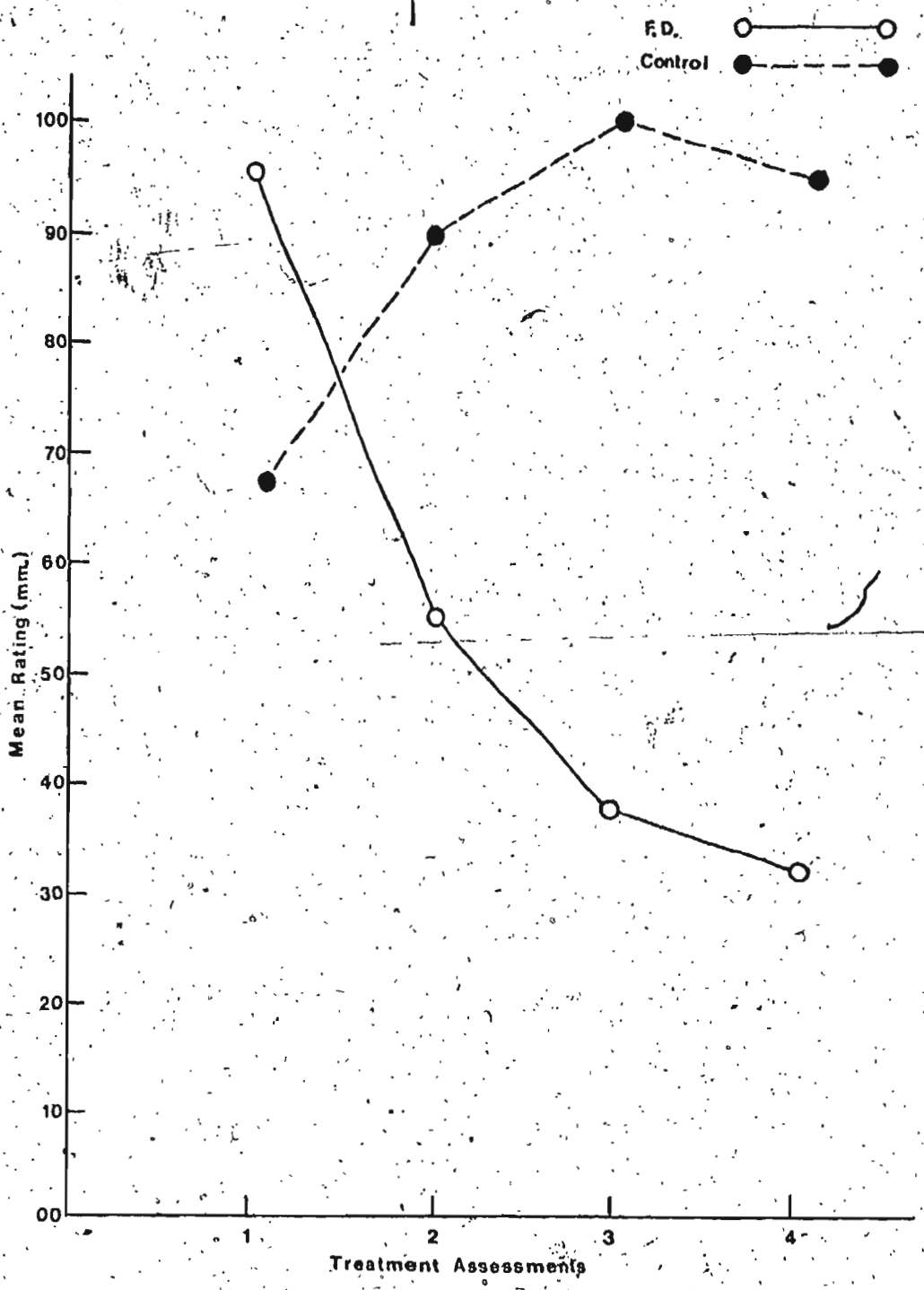

FIGURE 1

Patients' Subjective Ratings of Target Symptoms

Mean Changes Over 4 Experimental Periods

Comparisons between groups for each assessment period showed that the two did not differ at the initial assessment ($F = 1.8891$, $df = 1/7$, N.S.) nor at the 10 treatment (1 month) assessment ($F = 3.2525$, N.S.) but that there were significant differences at the 20 treatment (2 month) assessment ($F = 8.68787$, $p < .05$) and at the 30 treatment (3 month) assessment ($F = 8.7818$, $p < .05$).

Thus it is clear that patients who received the Faradic Disruption treatment rated themselves as considerably more improved with respect to their target symptoms than did the control group and this effect only became evident after the Faradic Disruption patients had received 20 treatments (rather than 10) indicating a slight delay of the effects of treatment.

TABLE 7

Analysis of Variance Summary for Patients' Subjective Ratings of Target Symptoms

Source	SS	df	MS	F	
A (groups)	8256.11	1/7	8256.11	3.31878	N.S.
S (subjects)	17413.9	7	2487.69		
B (assessments)	5210.08	3/21	1736.69	5.04392	<.05
A x B	11024.00	3/21	3674.68	10.6725	<.01
B x S (experimental error)	7230.60	21	344.314		

Psychiatric Rating of Target Symptoms

In a manner identical to patients' subjective ratings, scores for target symptoms were extracted for the psychiatric rating of patients' symptoms. These ratings involved initial and final assessment scores only, however, and consequently no subjects had to be dropped from the analysis.

The means and standard deviations for this rating are presented in Table 8.

These means are plotted in Figure 2 and illustrate that while the control ratings decreased very slightly from the initial to the final assessment, there was a correspondingly large decrease for the Faradic Disruption group during that period.

TABLE 8

Means and Standard Deviations for Psychiatric Rating of Target Symptoms

		1	4
Groups	Assessment	Initial	Final
Faradic Disruption (N = 6)	$\bar{X}$	6.33	2.67
	S.D.	(0.75)	(2.62)
Control (N = 4)	$\bar{X}$	8.00	7.75
	S.D.	(0.00)	(0.83)

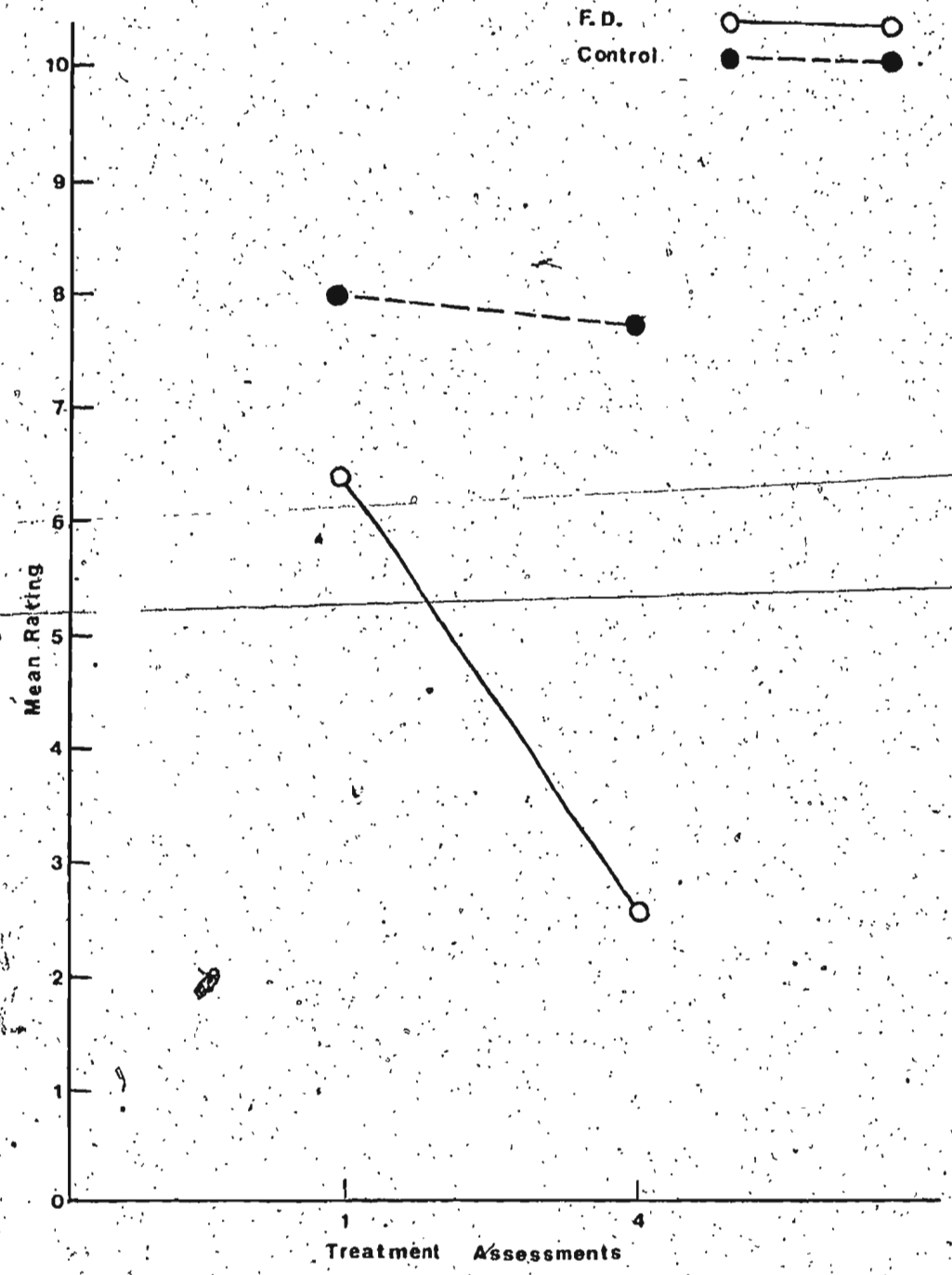

FIGURE 2

Psychiatric Rating of Target Symptoms

Mean Changes over 2 Experimental Periods

A summary of the analysis of variance performed on these data is presented in Table 9.

This analysis shows that the F ratios for both main effects (groups and assessments) as well as the interaction are sufficiently large to reject the null hypothesis. Inspection of Figure 2 would suggest that not only did the two groups differ in the pattern of change of this rating from initial to final assessments, but that the two groups may have significantly differed from each other in the initial assessment level of this factor.

TABLE 9

Analysis of Variance Summary for Psychiatric Rating of Target Symptoms

Source	SS	df	MS	F	
A (groups)	54.6748	1/8	54.6748	14.3999	<.01
S (subjects)	30.3750	8	3.79688	12.4165	<.01
A x B	14.0084	1/8	14.0084	6.57602	<.05
B x S (experimental error)	17.0418	8	2.13022		

Further tests showed that there was a significant decrease in this rating from initial to final assessment for the Faradic Disruption group ($F = 18.9339$, $df = 1/8$, $p < .01$) but not for the control group ($F = .58679$, N.S.).

Comparisons between groups allowed dismissal of the initial assessment differences ($F = 2.24956$, $df = 1/8$, N.S.) while confirming the large final assessment differences ($F = 20.9265$, $p < .01$).

It can be safely assumed, therefore, that the Faradic Disruption patients were rated by the independent psychiatric assessor as significantly more improved than the control group with respect to their target symptoms.

Patients' Subjective Ratings of Non-Target Symptoms

Four of the six Faradic Disruption patients and three of the four control patients had obsessive/compulsive symptoms other than those taken as target symptoms for treatment. For all but one case these non-target symptoms were untreated. The one exception was a Faradic Disruption patient who had received five treatments on one of his several non-target symptoms at the time of the final assessment. Inclusion of this symptom in the present analysis did not produce much change in cell means and consequently a division into treated and untreated non-target symptoms was considered unwarranted.

For each patient the symptoms which remained in the patients' subjective ratings of symptoms after extraction of the target symptoms scores, were used for this index. If two or more non-target symptoms were present, a mean was taken and used as a single measure.

The means and standard deviations for these ratings are presented in Table 10.

TABLE 10

Means and Standard Deviations for Patients' Subjective Ratings of Non-Target Symptoms

		1	2	3	4
Assessments		Initial	10 Treatments	20 Treatments	30 Treatments
Faradic Disruption	$\bar{X}$	82.50	59.25	50.00	52.50
(N = 4)	S.D.	(6.69)	(16.04)	(16.61)	(34.57)
Assessments		Initial	1 Month	2 Months	3 Months
Control	$\bar{X}$	72.00	54.67	58.33	68.00
(N = 3)	S.D.	(28.47)	(27.47)	(26.96)	(28.88)

These means are plotted in Figure 3 and suggest that over the four experimental periods, the ratings of both groups decreased somewhat, particularly from the initial assessment to the 10th treatment, or 1 month assessment.

Table 11, however, which presents a summary of the analysis of variance performed on these data, shows that the effect for both groups over the four periods was in fact non-significant.

Subsequent tests for simple main effects supported this conclusion in that no significant results were found across groups for the Faradic Disruption subjects ($F = 2.76677$, $df = 3/15$, $p < .10$) or for the control subjects

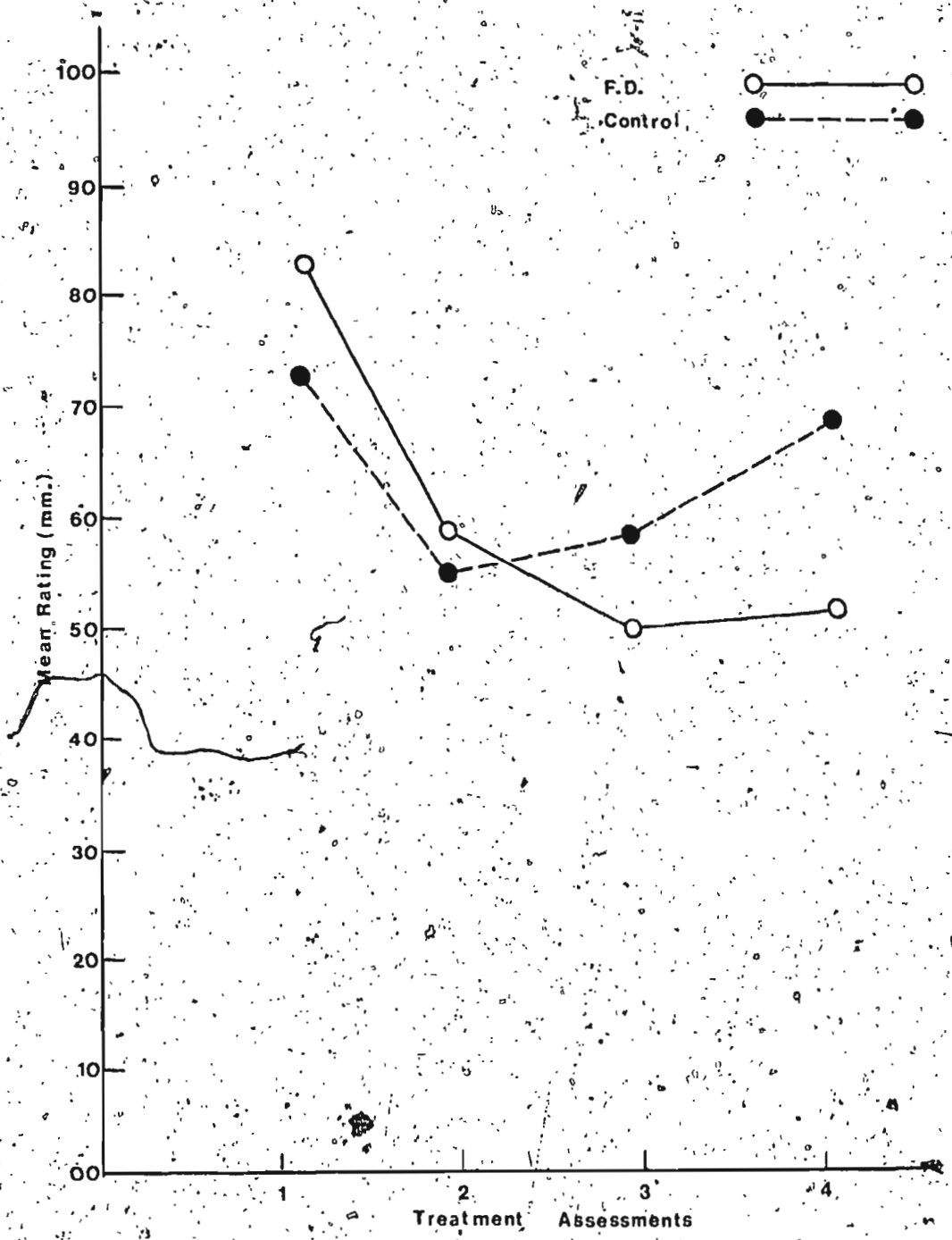

FIGURE 3

Patients' Subjective Ratings of Non-target Symptoms

Mean Changes Over 4 Experimental Periods

($F = .62066$, $p > .25$) nor were any significance differences found between groups at any of the assessment points.

TABLE 11

Analysis of Variance Summary for Patients' Subjective Ratings of Non-Target Symptoms

Source	SS	df	MS	F	
A (groups)	32.8125	1/5	32.8125	0.14008	N.S.
S (subjects)	11711.7	5	2343.34		
B (assessments)	2502.00	3/15	834.00	2.62793	N.S.
A x B	723.105	3/15	241.035	0.75950	N.S.
B x S (experimental error)	4760.40	15	317.360		

Psychiatric Rating of Non-Target Symptoms

The psychiatric rating of non-target symptoms was derived in the same manner that non-target symptoms were extracted from the patients' subjective symptom ratings. A mean was also taken and used as a single score in cases where two or more non-target symptoms were present.

The means and standard deviations for this rating was presented in Table 12.

These means are plotted in Figure 4 and as with the patient ratings of non-target symptoms appear to suggest that both groups were rated as having improved from the initial

to the final assessment.

Table 13 summarizes the analysis of variance for these data.

TABLE 12

Means and Standard Deviations for Psychiatric Rating of Non-Target Symptoms

		1	4
Assessment		Initial	Final
Faradic Disruption (N = 4)	$\bar{X}$	6.25	4.00
	S.D.	(0.83)	(1.41)
Control (N = 3)	$\bar{X}$	7.67	6.33
	S.D.	(0.47)	(1.25)

In this instance, the main effect for assessments was significant at the .05 level suggesting that both groups were rated as having improved from initial to final assessment. The tests for simple main effects elucidated this interpretation by showing that whereas the changes from initial to final assessment were significant for the Faradic Disruption group ($F = 10.7522$, $df = 1/5$, $p < .025$) they were not for the control group ($F = 2.83185$, N.S.). On the other hand, no significant differences between groups could be demonstrated at either the initial ($F = 2.13917$, $p < .25$) or the final assessment ($F = 5.80312$, $p < .10$).

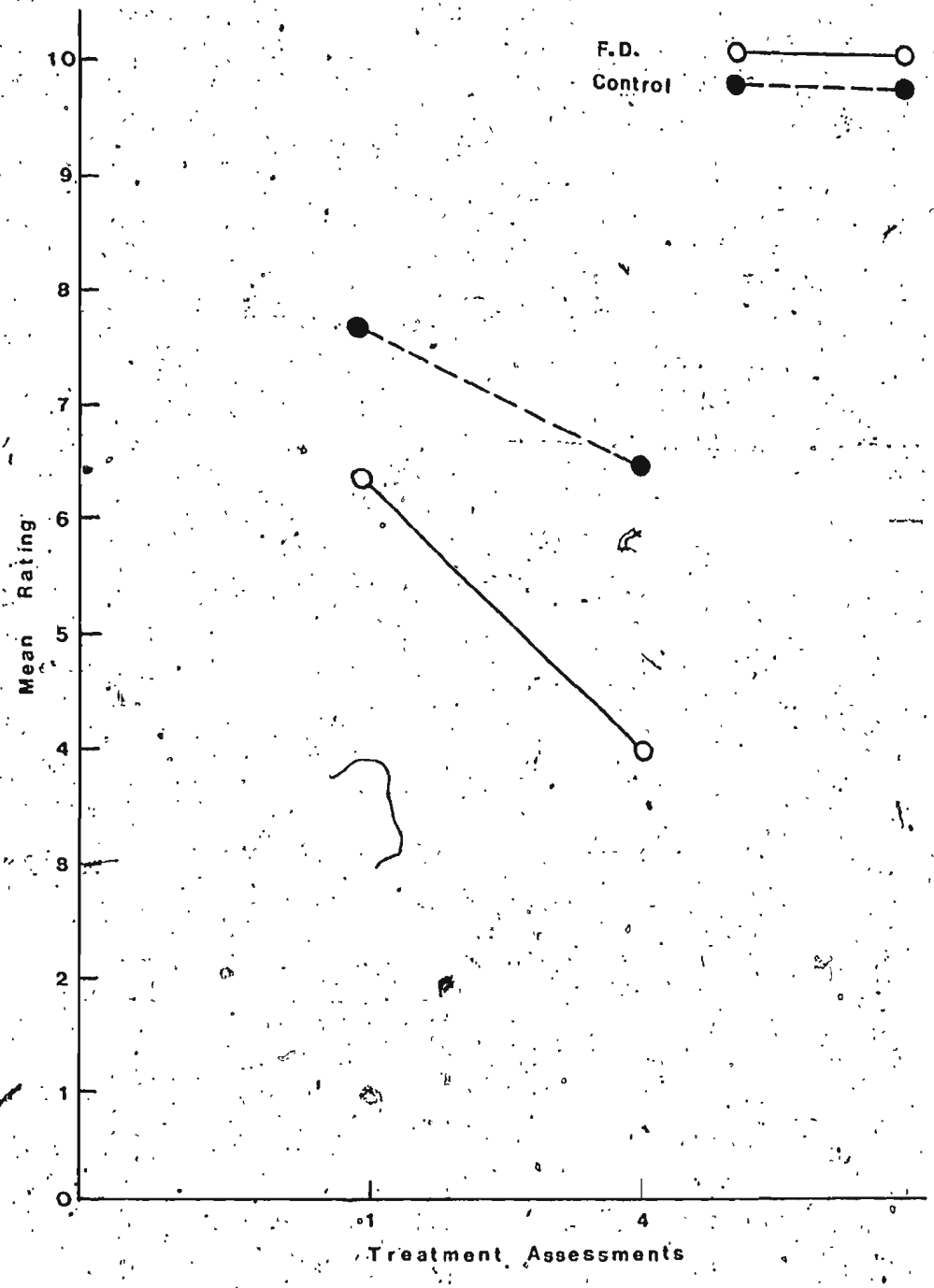

FIGURE 4

Psychiatric Rating of Non-Target Symptoms

Mean Changes Over 2 Experimental Periods

TABLE 13

Analysis of Variance Summary for Psychiatric Ratings of Non-Target Symptoms

Source	SS	df	MS	F	
A (groups)	12.0536	1/5	12.0536	5.29827	N.S.
S (subjects)	11.3750	5	2.27500		
B (assessments)	12.0714	1/5	12.0714	12.8192	<.05
A x B	0.72022	1/5	00.72022	0.76483	N.S.
B x S (experimental error)	4.70833	5	.94167		

While not as clear as the ratings of target symptoms, these statistical results on non-target symptoms can be interpreted as showing a significant improvement from pre- to post-treatment levels for the Faradic Disruption patients and an obsence of such change among control patients.

These ratings also clarify somewhat the results found in the patients' subjective ratings of non-target symptoms where the simple main effects for the Faradic Disruption group (over the four assessment periods) approached significance ($p < .10$).

Psychiatric Adjustment Rating

As mentioned previously (psychometric assessments) a single impairment score for each patient was derived from the psychiatric adjustment rating. Table 14 presents the

means and standard deviations for this rating.

TABLE 14

Means and Standard Deviations for Psychiatric Adjustment Ratings

		1	4
Assessment		Initial	Final
Faradic Disruption (N = 6)	$\bar{X}$	9.67	5.67
	S.D.	(3.68)	(4.27)
Control (N = 4)	$\bar{X}$	8.75	8.25
	S.D.	(5.89)	(4.49)

These means are plotted in Figure 5 and show that while there is an overall decrease in this index from the initial to the final assessment for both groups, there is a considerably larger drop for the Faradic Disruption group.

Table 15 presents the analysis of variance summary for this data.

The analysis of variance illustrates that the decrease in the rating for both groups from initial to final assessment is in fact significant. The interaction effect approached significance at the .05 level (critical value = 5.32) but was not sufficient to reject the null hypothesis.

Subsequent tests for simple main effects confirmed the trend, however, as there was a significant effect for

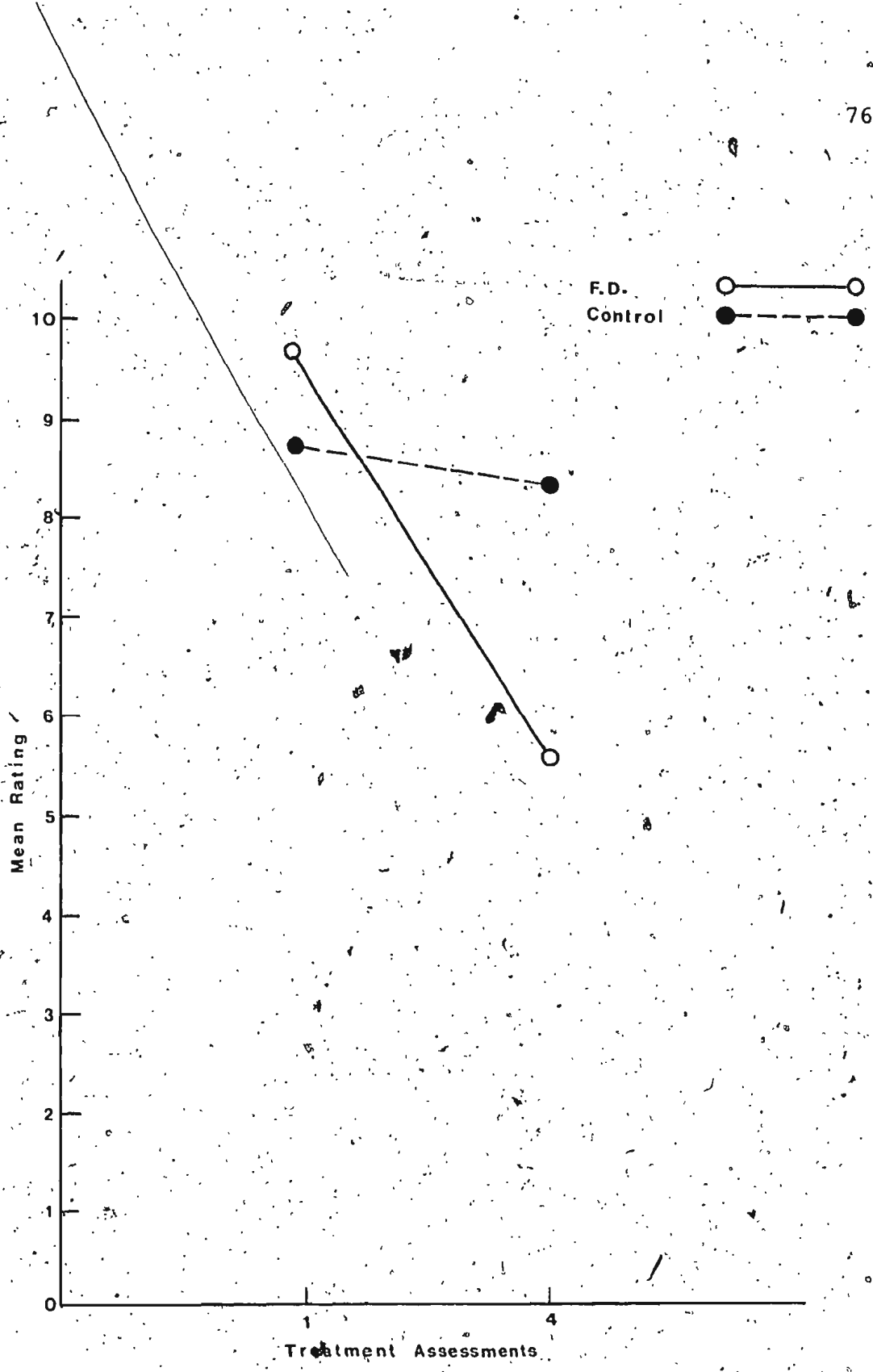

FIGURE 5

Psychiatric Adjustment Rating

Mean Changes Over 2 Experimental Periods

the Faradic Disruption group from pre- to post-treatment assessments ($F = 17.0665$, $df = 1/8$, $p < .01$) but not in the control group ($F = 1.7777$, N.S.).

As with the psychiatric rating of non-target symptoms, however, no significances between groups were found at either the pre-treatment assessments ($F = .078667$, $df = 1/8$, N.S.) or at the post-treatment assessment ($F = .62478$, N.S.).

On the basis of the first test it can be seen that there was a clear tendency for the Faradic Disruption group to improve on this measure over the duration of the experiment.

TABLE 15.

Analysis of Variance Summary for Psychiatric Adjustment Ratings

Source	SS	df	MS	F	
A (groups)	3.3333	1/8	3.3333	0.687876	N.S.
S (subjects)	387.667	8	48.4583		
B (assessments)	33.7999	1/8	33.7999	12.0176	<.01
A x B	14.7000	1/8	14.7000	5.2266	N.S.
B x S (experimental error)	22.5002	8	2.82513		

IPAT Self-Analysis Questionnaire

Table 16 presents the means and standard deviations for the IPAT Self-Analysis Questionnaire with the one control patient for whom intermediate ratings were not available excluded from the analysis.

These means are plotted in Figure 6 and show that neither group changed in this evaluation during the course of the investigation.

This is confirmed by the non-significant results obtained in the analysis of variance (Table 17) and suggests that there was no change in trait anxiety in either group over the duration of the experiment.

Fear Survey Schedule (F.S.S.)

The restrictions for this analysis are identical with those reported for the IPAT scale. Table 18 presents the means and standard deviations for the F.S.S. while the analysis of variance summary is given in Table 19.

The means for the F.S.S. scores are plotted in Figure 7. While there appears to be a group difference for this measure in that the control group have overall lower scores, the analysis of variance reveals that this difference is not significant. Essentially it appears that as with trait anxiety no changes in situational anxiety responses took place over the duration of the experiment.

Latency of Image (Thought) Formation

A description of the basic design for the evaluation of changes in the latency of image formation has been previously given.

TABLE 16

Means and Standard Deviations for IPAT Self-Analysis Questionnaire

		1	2	3	4
Assessments		Initial	10 Treatments	20 Treatments	30 Treatments
Faradic Disruption (N = 6)	$\bar{X}$	51.30	55.50	49.33	50.83
	S.D.	(8.38)	(7.02)	(9.01)	(13.57)
Assessments		Initial	1 Month	2 Months	3 Months
Control (N = 3)	$\bar{X}$	46.00	39.3	42.33	41.00
	S.D.	(7.12)	(15.15)	(16.94)	(17.68)

TABLE 17

Analysis of Variance Summary for IPAT Self-Analysis Questionnaire

Source	SS	df	MS	F	
A (groups)	734.722	1/7	734.722	1.20456	N.S.
S (subjects)	4296.66	7	609.951		
B (assessments)	61.555	3/21	20.5185	0.634907	N.S.
A x B	136.277	3/21	45.4257	1.40561	N.S.
B x S (experimental error)	678.664	21	32.3173		

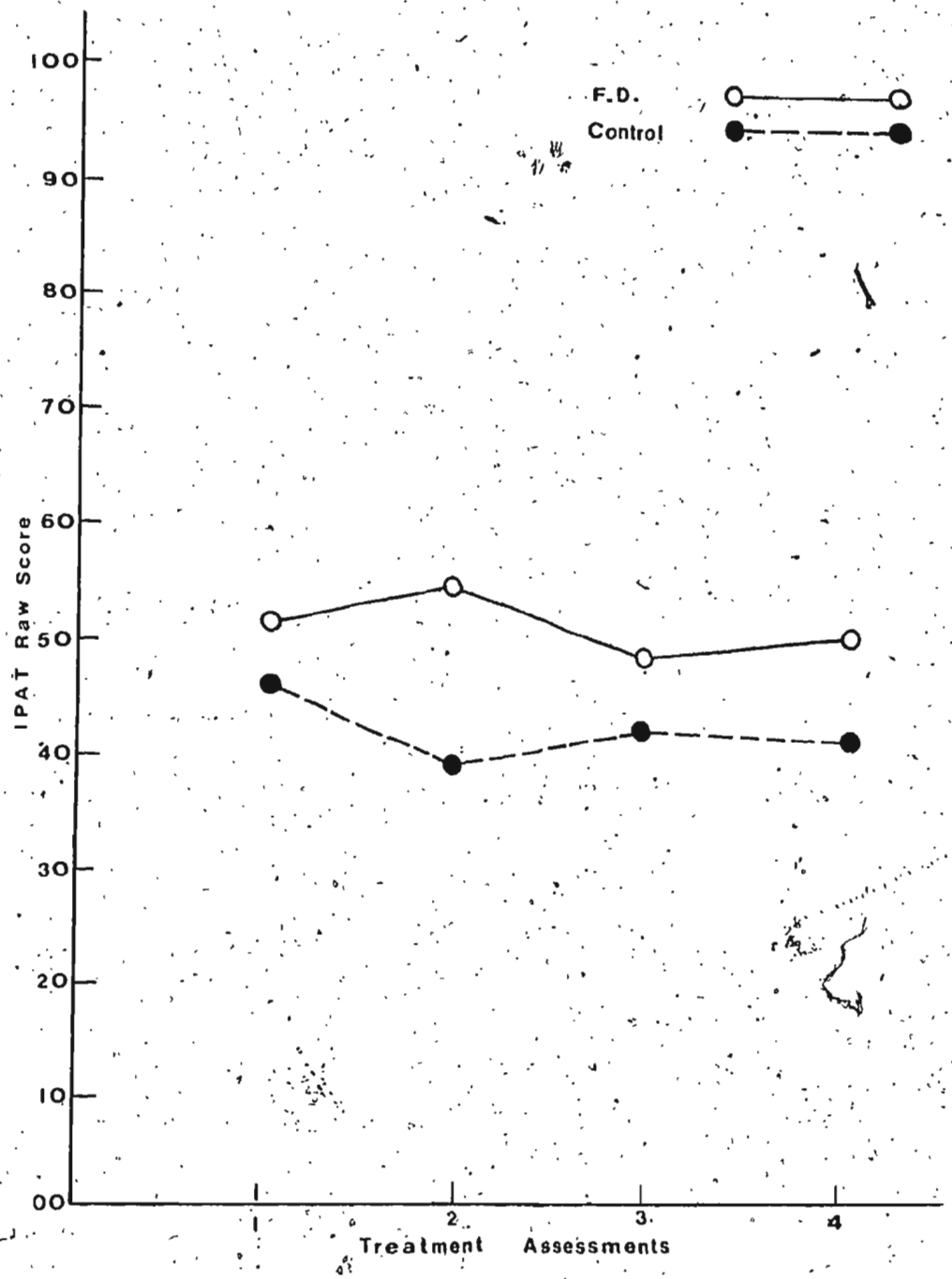

FIGURE 6

Changes in IPAT over Four Experimental Periods

TABLE 18

Means and Standard Deviations for Fear Survey Schedule

		1	2	3	4
Assessments		Initial	10 Treatments	20 Treatments	30 Treatments
Faradic Disruption (N = 6)	$\bar{X}$	144.00	149.83	134.33	130.67
	S.D.	(61.58)	(68.42)	(56.64)	(61.68)
Assessments		Initial	1 Month	2 Months	3 Months
Control (N = 3)	$\bar{X}$	113.67	83.00	72.33	78.33
	S.D.	(42.07)	(57.46)	(53.48)	(54.13)

TABLE 19

Analysis of Variance Summary for Fear Survey Schedule

Source	SS	df	MS	F	
A (groups)	22366.1	1/7	22366.1	1.47229	N.S.
S (subjects)	106339.0	7	15191.3		
B (assessments)	2868.08	3/21	956.027	1.04818	N.S.
A x B	1573.06	3/21	524.354	0.574899	N.S.
B x S (experimental error)	19153.7	21	912.080		

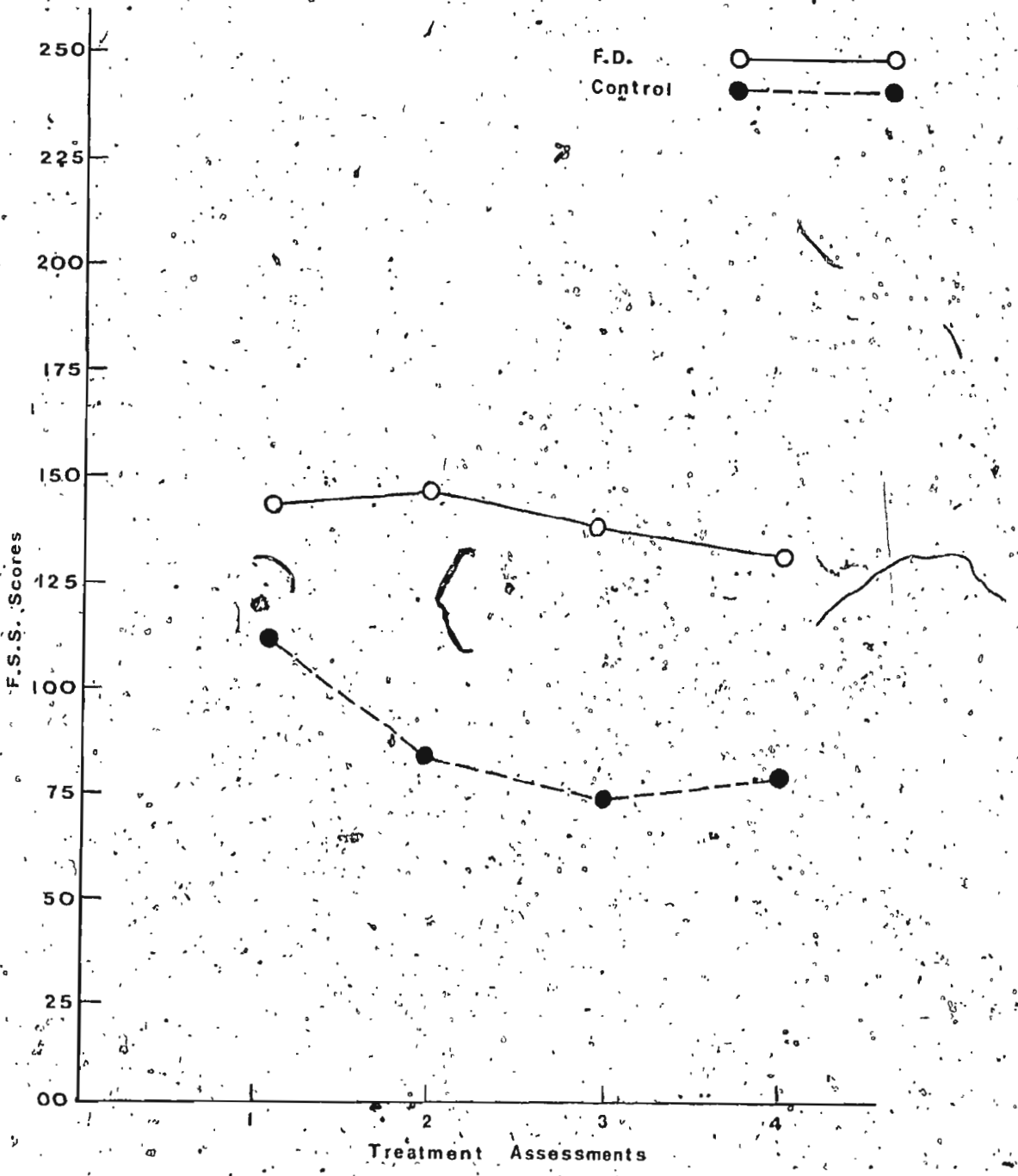

FIGURE 7

Mean Changes in F.S.S. over Four Experimental Periods

As the decision to make assessments of neutral images was made after the initiation of the experiment, two Faradic Disruption patients were not evaluated on this dimension and were not included in this analysis.

As the data from the control patient who declined to make treatment ratings did not appear in this instance to alter the pattern of cell means; his scores were included in the present analysis. The omitted within-treatment scores were taken in the analysis as missing data which initiated a least-squares solution for the analysis of variance program.

The means and standard deviations for latency of image formation of obsessive and neutral images are presented in Table 20.

The means are plotted in Figure 8 which shows that the latency of image formation increased greatly over the four experimental periods for the treated obsessive images while the untreated obsessive images and the two sets of neutral images remained basically unchanged.

A 3-way mixed model analysis of variance was performed on these data using a balanced design. The first factor (A) represented the two experimental groups, the second factor (B) represented the two levels of images (experimental and neutral), while the third factor (C) denoted the four assessment periods. This analysis is summarized in Table 21.

As can be noted from Table 21 the large F ratios led to a rejection of the null hypothesis for all main effects and all interactions. Inspection of Figure 8 shows clearly

TABLE 20

Means and Standard Deviations for Latency of Image Formation

		OBSESSIVE IMAGES				NEUTRAL IMAGES			
		1	2	3	4	1	2	3	4
Assessments		Initial	10 Treatments	20 Treatments	30 Treatments	Initial	10 Treatments	20 Treatments	30 Treatments
Faradic Disruption (N = 4)	$\bar{X}$	5.15	19.10	33.90	45.35	3.90	3.10	3.83	2.98
	S.D.	(1.52)	(19.20)	(19.94)	(17.38)	(0.99)	(0.94)	(2.04)	(0.89)
Assessments		Initial	1 Month	2 Months	3 Months	Initial	1 Month	2 Months	3 Months
Control (N = 4)	$\bar{X}$	2.23	1.58	1.88	2.23	2.08	1.48	1.35	1.85
	S.D.	(0.59)	(0.98)	(1.28)	(1.15)	(0.46)	(0.86)	(0.79)	(0.82)

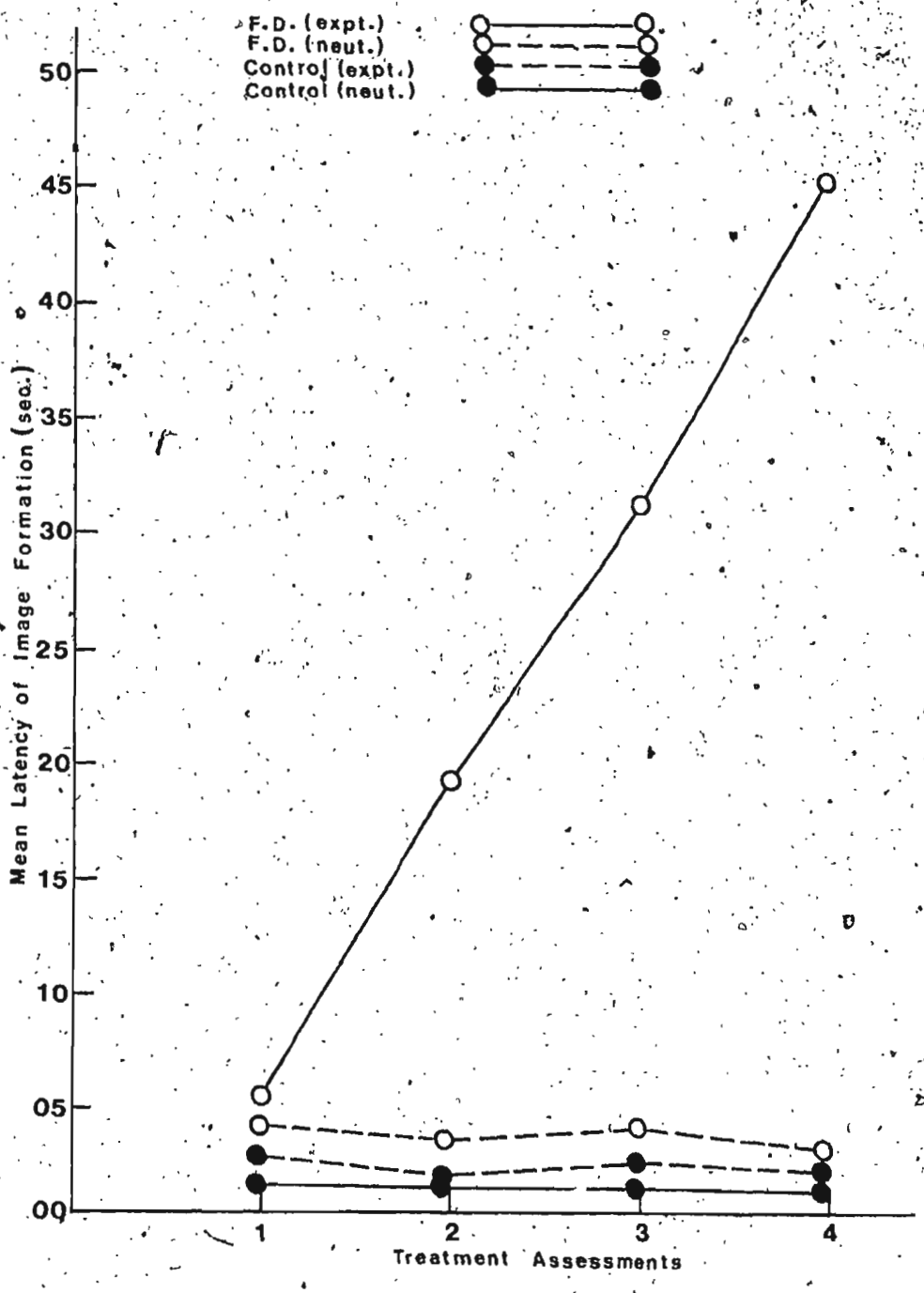

FIGURE 8

Mean Changes in Latencies of Experimental and Neutral Images

that all of these significant results were a result of the substantial changes which took place among the treated obsessive images (Faradic Disruption group). Furthermore, as all of the values of the Faradic Disruption experimental image group for the 10, 20, and 30 treatment assessments were greater than all values in all other cells, it was decided that further analysis (i.e., for simple main effects) would be redundant.

TABLE 21

Summary of 3-Way Analysis of Variance for Latency of Image Formation

Source	SS	df	MS	F	
A (groups)	2618.87	1/6	2618.87	12.2908	<.05
S (subjects)	1278.45	6	213.076		
B (images)	2077.08	1/6	2077.08	9.02691	<.05
A x B	1947.02	1/6	1947.02	8.46169	<.05
B x S	1380.59	6	230.098		
C (assessments)	897.461	3/18	299.154	6.70490	<.01
A x C	892.254	3/18	297.418	6.66599	<.01
C x S	803.109	18	44.6172		
B x C	973.750	3/18	324.583	6.70696	<.01
A x B x C	919.098	3/18	306.366	6.33053	<.01
B x C x S	871.109	18	48.3950		

It is clear, therefore, that the significant effects found in the preceding analysis of variance are directly attributable to large increases in the cell means for the Faradic Disruption obsessive images. It can be concluded that the application of Faradic Disruption to obsessive ideations results in a large increase in the latency of formation of those images and furthermore that the effect remained specific to those images as evidenced by the lack of change in the neutral images.

Summary of Experimental Results

Bearing in mind the differences in the number of cell subjects in some of the analyses, the following results were evident:

1) The Faradic Disruption treatment produced a significantly greater decrease in target symptoms than did the control procedure according to patients' subjective ratings;

2) The independent psychiatric rating showed a significantly greater reduction in target symptoms among the Faradic Disruption group;

3) No significant differences were found between groups on the patients' subjective ratings of non-target symptoms. However, a test for simple main effects did reveal a significant change from pre- to post-treatment assessment among the Faradic Disruption group on the psychiatric rating of non-target symptoms, a change not evident among control patients. Thus there is statistical

evidence to support the clear data-based trend that the Faradic Disruption treatment does evoke changes in non-target symptoms;

4) An independent psychiatric rating showed a significantly greater decrease in impairment of adjustment among the Faradic Disruption group than among the control group;

5) There were no significant changes in measures of trait anxiety (IPAT) or situational anxiety (F.S.S.) among either group during the experiment; and

6) The application of Faradic Disruption resulted in a significant increase in the latency of image formation of the treated obsessive images, an effect which did not occur in the neutral images nor occur in either the obsessive or neutral images in the control subjects.

Follow-up

A discussion of the follow-up procedure has been previously given (experimental format). As mentioned the median follow-up period for the six patients who have successfully completed therapy is three months. At present there is sufficient data to present follow-up data only for the one and three month periods.

The means, standard deviations and numbers of cell subjects for these six patients are presented in Table 22 for subjective ratings of target symptoms, subjective ratings of non-target symptoms, the IPAT anxiety questionnaire and the F.S.S.

The means for target and non-target symptoms are plotted in Figure 9. It can be seen that there was a continued slight decrease in target symptoms after one month follow-up, while there was a correspondingly larger drop from 30 treatments to one-month follow-up in non-target symptoms. This latter result undoubtedly reflects the additional treatments received by some Faradic Disruption patients for their non-target symptoms.

At three-month follow-up the slight decrease in subjective ratings of target symptoms was maintained. However, a return to post-treatment levels was noted for non-target symptoms. These latter results are particularly difficult to interpret as the small number of subjects followed up causes the means to be particularly influenced by single entries; for example, at 3 months follow-up one patient rated his non-target symptoms as somewhat higher than at 1 month follow-up, while claiming that he had felt he had continued to improve.

Table 22 also shows that no changes occurred in the means for IPAT and F.S.S. at follow-up. This substantiates the findings that these variables do not change with treatment.

Finally, there are insufficient data at 6 months follow-up to make even a tentative conclusion, however, since one patient of three followed-up to that point has experienced some relapse, it is obvious that an extensive follow-up is critical for treatment evaluation.

TABLE 22

Experimental and Follow-Up Statistics for 6 Successfully Treated Patients

	TREATMENT ASSESSMENTS				FOLLOW-UP	
	Initial	10 Treatments	20 Treatments	30 Treatments	1 Month	3 Months
Target Symptoms						
N	6	6	6	6	5	4
$\bar{X}$	91.67	53.83	29.83	23.17	19.40	19.25
S.D.	(13.41)	(31.82)	(22.96)	(32.21)	(22.93)	(4.99)
Non-Target						
N	3	3	3	3	3	3
$\bar{X}$	81.33	52.00	44.00	40.53	26.00	41.67
S.D.	(9.02)	(14.11)	(18.33)	(40.53)	(25.12)	(33.20)
IPAT						
N	6	6	6	6	4	4
$\bar{X}$	50.0	52.67	46.33	46.83	48.50	55.00
S.D.	(32.63)	(9.00)	(23.44)	(26.88)	(6.64)	(11.02)
F.S.S.						
N	6	6	6	6	4	4
$\bar{X}$	130.0	125.17	108.50	99.67	115.25	143.00
S.D.	(64.22)	(57.78)	(44.54)	(40.02)	(48.99)	(27.54)

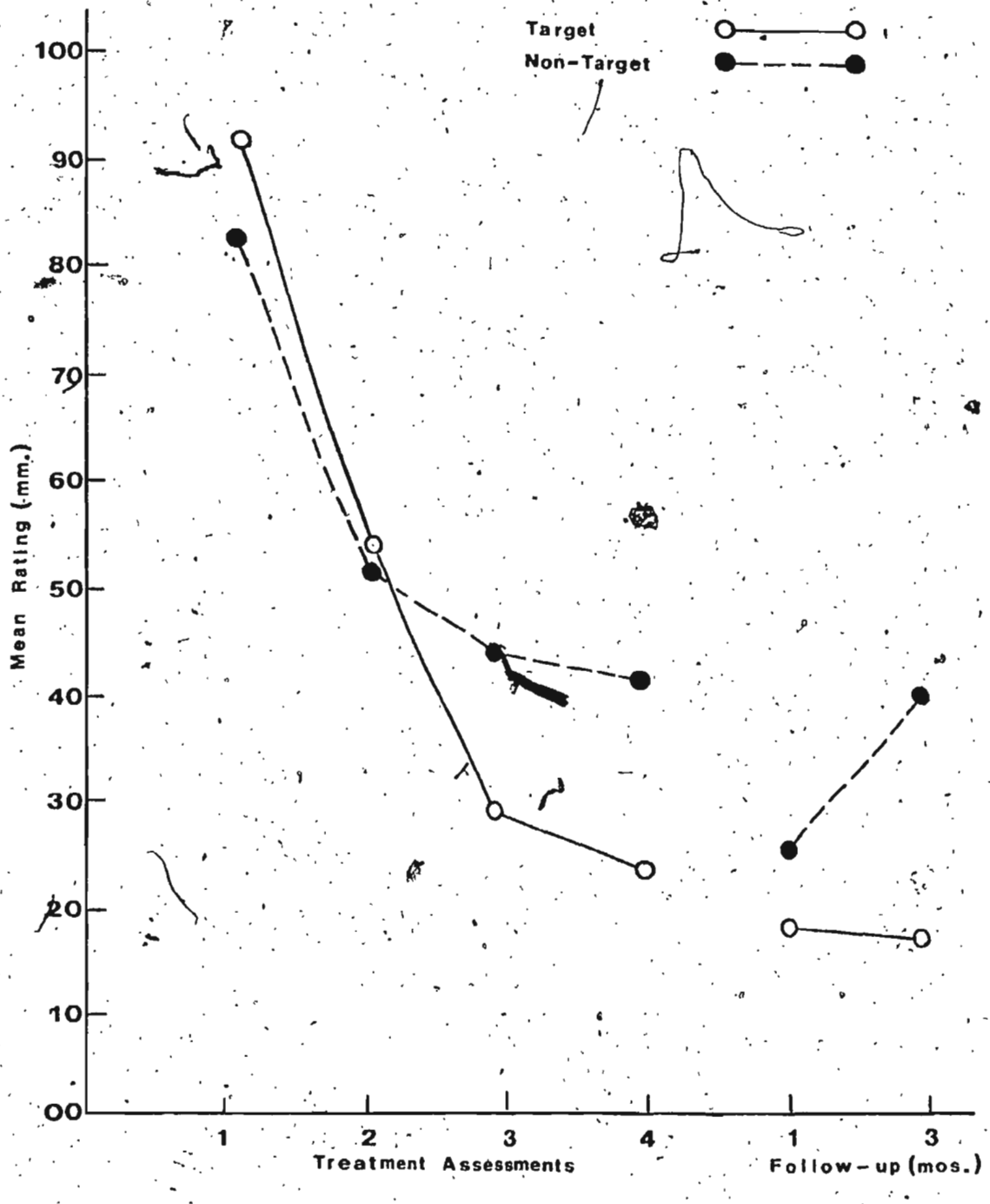

FIGURE 9

Mean Changes in Patients' Subjective Ratings of Target and Non-Target Symptoms

SECTION III

DISCUSSION

Interpretations of Experimental and Clinical Results

There are several factors that limit the interpretation of the results of the experiment. The effect of the small number of subjects that were obtained for the study was complicated by the fact that the number of subjects in each of the two groups was not the same for all of the statistical analyses. Completely matched samples were not achieved and consequently two potentially important experimental variables, sex and type of obsessive disorder, were uncontrolled in the experiment.

The evaluation of the effects of treatment relied entirely on subjective ratings of symptom changes and although this was done on a semi-objective basis, by using spec[illegible] rating forms and by having an independent psychiatric rating, such evaluations do not possess a high degree of precision and/or reliability.

Finally, the follow-up period has not been extensive enough to determine the long term effects of the treatment, particularly as one patient has been observed to relapse after six months.

Despite these limitations, at least the main effects of the experiment are relatively clear. First, the application of the aversive treatment (Faradic Disruption) to obsessive ideation resulted in large decreases in target obsessive-compulsive symptoms. This was evident both in the

patients' subjective rating and the psychiatric rating. At the three-month follow-up, it appears that this change is relatively durable. However, it has already been stated that judgement must be withheld about the long term effects.

Secondly, the application of Faradic Disruption leads to large increases in the latency of image and thought formation and the effects of the aversive paradigm are restricted solely to those images being treated, as evidenced by the fact that no changes in neutral images were observed among the patients receiving treatment. There appears to be a correspondence between the increase in the latency of image formation and the decreases in frequency and severity of target symptoms. In individual treatments, it has been observed that the latency measure serves as a good index of treatment progress. Generally speaking, if the latencies are increasing over treatment sessions, clinical improvements will accompany them or shortly follow, although in at lease one case in this experiment a large increase in latencies was not indicative of permanent improvement.

In a previous paper (Kenny et al., 1973) it was noted that treatment of target symptoms had ancilliary effects in that improvements in non-target symptoms appeared to accompany the application of Faradic Disruption to the target symptoms. There was a definite tendency for such an effect in the present experiment which was statistically significant in the case of the psychiatric rating but not in the self-ratings.

Another notable effect of treatment was that the patients who received it were rated as having improved in their adjustment to general life situations as exemplified by the significant changes noted on the psychiatric adjustment rating. However, it is to be expected that the reduction of very often crippling obsessions should lead to improved functioning in many spheres of activity.

Finally, it is quite obvious from the experiment that the treatment effects do not extend beyond the boundaries of the obsessional symptoms. Neither general situational anxiety responses nor trait anxiety showed any change over the experimental period.

Thus the effects of Faradic Disruption of obsessive neurosis appear to be relatively straight-forward. Its immediate effects are a large increase in the latency of image formation of the treated obsessive ideations and a large decrease in intensity of the target symptoms. Its secondary effects are to cause an overall improvement in functioning in those types of activity which were formerly being impaired by the obsessive neurosis. There is still some question of whether Faradic Disruption extends its effect to untreated obsessive symptoms but it certainly does not affect general situational anxiety (phobic responses) nor general trait anxiety. For the very short term, it appears to produce a lasting change for most treated subjects; however, there is still insufficient evidence to conclude that it is a permanent effect, or at least adequate

to allow for a complete institution of new behaviour in place of the old obsessive responses.

Patient Responses to Treatment

As twelve patients originally entered treatment and only six were successfully treated, it is of importance to discuss patients' responses to treatment.

One of the twelve patients had begun treatment and had shown improvement but had to be dropped because of over-medication. The effects of concurrent medications is a factor which needs careful attention in the future.

Two of the original twelve dropped out of treatment due to an inability to tolerate the aversive stimulus. One of these terminated even though he rated himself considerably improved and there is a suspicion that there were other motives involved. Nevertheless a high drop-out rate appears to be a common phenomenon in aversive therapies in general and due to the very nature of the treatment, there seems to be very little that can be done to alleviate this problem.

One very peculiar phenomenon that occurred in the study was the finding that one patient had such a high tolerance for electroshock that an adequate aversive stimulus could not be found for him. No reports have been found of this phenomenon. However, the obvious conclusion is that aversion therapy may have limitations in terms not only of over-sensitivity but of insensitivity as well.

As a result of effects associated with aversion therapy in general, and the treatment setting, four of the

12 patients did not manage to complete a full course of treatment.

Of the remaining eight patients, one patient had just begun treatment after being in the control group so that a total of seven have managed to complete treatment, and as mentioned, six of the seven were considered as having responded successfully.

It appears, therefore, that a good portion of the difficulty involved in using Faradic Disruption is directly related to the use of aversion therapy in general and it can be expected that similar difficulties in the future should arise.

One patient, despite a rapid rise in latency of image formation, did not improve -- although there were two periods of improvement within the treatment period. Most patients when they come for treatment have usually had their obsessional disorders for many years and their conditions are relatively stable. This patient's problems, of only three years duration, were anything but stable and it is suspected that this patient may have been still in the process of forming obsessions, whatever this might be expected to entail. It was noted over the 30 treatments that this patient did report on newly arisen obsessional problems. A similar type of circumstance was noted in the one patient who considered herself only moderately improved. It is possible, therefore, that the approach to very acute obsessive-compulsive disorders might need to be different

from the approach taken with more chronic patients.

There are a number of other variables which may also be important to the general efficacy of Faradic Disruption. Such factors as personality characteristics, personal environmental characteristics, conditionability, numbers and type of other neurotic symptoms, motivation, and expectancy may all have varying degrees of influence on therapeutic outcome. A general discussion of these factors is, however, too lengthy for present purposes.

The Nature of Obsessive Ideations

As mentioned in the Introduction, the fact that treatment using the presently described procedure resulted in considerable symptomatic improvement, does not in itself provide direct evidence for the functional nature of obsessive ideations in the complex of obsessive-compulsive disorders. Other explanations are possible for the treatment effect -- for example, it might be suggested that the Faradic Disruption method is simply punishing compulsive phenomena through their internal representations. It must be acknowledged in this regard that the images derived from lists of obsessive ideations are certainly not free from reference to patients' compulsive behaviour. Often the ideations are integrally linked with images of compulsive behaviour and it is sometimes very difficult to separate the two. It is also impossible to know what the contents of the obsessive ideations really are when patients are conjuring them up -- some patients do make statements such as "When I get that thought, I always

see myself doing .....".

On the other hand, it is of interest to note that there is a consistency in the types of reports that patients give concerning their treatment changes. The most preferred position is incorporated in statements such as the following: "The thoughts come less frequently when I'm at home and even when they do come, they don't seem to bother me very much. So I feel I don't have to do so much checking".

In essence, patients' reports of their subjective experience during treatment is that they finally 'get those thoughts under control'. These are meaningful statements that support the notion that it is in fact the obsessive ideations which are critical to treatment success and not punishment of mental imagery of compulsive behaviour. In addition, in a previous report (Kenny et al., 1973) it was found that when lists of images of compulsive behaviour were treated before the obsessive ideations, considerable difficulty arose as the patients could not carry out their checking rituals but still felt a strong urge to do so.

In the long-run, there is actually very little experimental basis to make an argument in either direction but the experimental results do at least provide a rationale for the further investigation of the nature of obsessive ideations.

The Nature of Faradic Disruption

It has been suggested that the aversive paradigm described under the rubric of Faradic Disruption does not

strictly fit existing aversive models such as punishment or avoidance or escape conditioning. Although this seems to be a considerable deviation from conventionally acceptable theories, there is currently considerable dispute over the nature of the effects of aversion therapy in general (c.f. Hallam & Rachman, 1972) so that the present departure does not appear to be too radical.

Again, it is not suggested that the presently obtained experimental results in any way provide evidence for the separation of the Faradic Disruption paradigm from the other models -- this is being offered only on logical grounds. There is not even hard evidence to counter one proposal offered to the author that the treatment paradigm results in nothing more than conditioned finger lowering. What is actually occurring in the Faradic Disruption procedure can only be inferred and surmised.

Once more, however, patient reports are of interest. During individual sessions, the most commonly encountered experience is exemplified in the following report: "I get the thought and fight off the shock as you told me to, but eventually the image just 'blinks-out' without my making it do so." These types of statements lend support to the notion that the treatment action may occur at a level beyond voluntary patient behaviours such as raising and lowering his finger, deliberately thinking or not thinking about the ideations, etc.

The fact that improvement occurred in this experiment also does not rule out the possibility that other paradigms, for example a classical paradigm with a single UCS, would be more efficacious than the Faradic Disruption paradigm, particularly in light of the excellent results obtained by Marks and Gelder (1967) in the treatment of fetish images. The superiority of any particular aversive paradigm would be a simple matter to determine experimentally.

Finally, if it is assumed that obsessive ideations do serve an important function in obsessive neurosis and if it is assumed that Faradic Disruption does produce a reduction in these ideations, how then are the results produced? Marks (1968) suggests an experimental repression, a term which implies to this author a powerful but transient phenomenon. This may be an adequate explanation of the present paradigm particularly in view of the fact that some relapse has been noted in the experiment. If this explanation is given, however, then it seems logical to suggest that the good clinical results must be produced by providing patients with a chance to learn new adaptive behaviours during the interval between post-treatment and the point at which the repression loses its effect. This suggests that a thorough investigation of patient's post-treatment behaviour would be of considerable importance in this regard.

Summary and Conclusions

Two groups of obsessive-compulsive patients were designated for the present study and were only partially

matched. The experimental group (N = 6) was given 30 sessions of an aversion therapy (Faradic Disruption) which was applied to derived lists of obsessive ideations. The waiting-list control group (N = 4) was delayed for a three-month period before beginning cross-over treatments. Pre- and post-treatment assessments as well as within-treatment assessments were equated for both groups and consisted of patients' subjective ratings of their symptoms, a blind psychiatric rating of their symptoms, a psychiatric adjustment and the IPAT and the F.S.S. psychometric tests. A median follow-up period of three months has been made on all patients successfully completing Faradic Disruption treatment.

It was found that the application of Faradic Disruption to obsessive ideations resulted in a large decrease in patients' target obsessive-compulsive symptoms and that this in turn resulted in improved adjustment to general life situations. Improvement in target symptoms was accompanied by a large increase in latency of image (thought) formation among treated patients. There was some suggestion that the effect of treatment might extend to non-target symptoms but no evidence of changes in general situational anxiety or trait anxiety was noted.

Of seven patients who completed the full course of treatment, only one failed to improve. Of the six who were improved, one has shown a partial relapse after six months.

Although Faradic Disruption appears to produce immediate improvement in obsessive-compulsive symptoms,

any statements as to the permanency of the effects must be seriously reserved.

Finally, it is suggested that the successful treatment results provide very indirect evidence for the functional nature of obsessive ideations in obsessional neurosis.

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APPENDIX A

A Brief Description of the Obsessive-Compulsive Patients Participating in this Study

Faradic Disruption Patients

Patient 1 - This 22-year old, single girl was an orphan and domestic since her mother's death five years previous. Having been in conflict with her mother at that time, and having engaged in some childhood fantasies of wishing her mother was dead, she became extremely disturbed when her mother actually did die in her presence. She subsequently became obsessed with memories of the attack and funeral and with thoughts that her mother would spiritually return for revenge. This steadily deteriorating obsession was coupled with a compulsion to spend every free moment at her mother's grave. As a consequence, these thoughts had been on her mind almost continuously for the past six years and she did little else besides work and visit her mother's grave. Fear of her mother coming for revenge at night also resulted in a severe sleep disturbance.

The images used in treating this patient are listed in Table 4 and she responded quickly in 20 treatment sessions, after which she was given once weekly booster sessions. On follow-up there was a continued improvement. However, she rated herself as relapsed at six-month follow-up for manipulative reasons (see method). At one year follow-up she rated herself as even more improved than on any previous occasion.

Patient 2 - This 42-year old, married labourer was plagued with doubts that he had not properly fixed railroad locks and switches and that other types of associated work

tasks had been performed inadequately. These doubts were coupled with a fear that his performance would result in some terrible accident and together they led to a large amount of ritualistic checking and rechecking.

This patient had a 15-year fluctuating course of illness which in the long run was becoming more and more incapacitating and occupied most of his waking time. He was also a nuisance to his family and friends in that he continually sought reassurances that he had done his work properly. Despite his neurosis, he had not terminated work.

The first 25 treatment sessions were devoted to the target symptom of pulling on railroad locks over and over again. The treatment list was composed mostly of the doubts and fears he had about this task but interspersed in the list were some images of the compulsive acts.

Improvement began after about eight sessions and steadily continued. After the twenty-fifth session, two new lists of ideations were constructed concerning other job tasks and illness fears. These symptoms improved even more quickly and the patient was able to terminate after a total of 48 sessions feeling that he was in control of his compulsive behaviour and had few doubts or fears.

Follow-up at one, three and six month periods showed a continuance of improvement and the patient reported that he was gradually becoming better adjusted not only at work but in other endeavours as well.

Patient 3 - This 68-year old, widowed housewife had been obsessed since the age of 17 with the idea that something she might do in the way of housework might cause someone to go blind. Originally this fear was centered around her father but later extended to her two sons. As a result, her day consisted of time-consuming household rituals which were initiated to prevent this occurrence.

The thoughts used for treatment are listed in Table 5 and give a clear picture of the nature of her obsession.

Initially she responded with minimal improvement and there was not any substantial change in the latency of image formation. After approximately 15 sessions, however, the treatment appeared to take hold and she experienced a rapid improvement resulting in discharge after 30 sessions.

At one and three month follow-up she reported further improvement. However, at six months she reported that the thoughts had been returning and that she had recommenced some of her rituals. She was offered booster treatments at this time but she refused them stating that she wanted to wait before resorting to this because she still felt she had some control over the problems. This patient has not yet been seen for a one-year assessment and it is not known whether or not she achieved that goal.

Patient 4 - This 33-year old, single secretary had a three year history of obsessive neurosis stemming primarily from an incident four years previous in which she accidentally started a small fire by leaving on element on on her

stove. She subsequently developed a full-blown obsessional disorder which resulted in her spending many hours a day checking the stove, doubting that she had not done it correctly and being unable to leave it unattended. By the time she came for treatment and continuing during treatment, the patient's checking and rechecking had extended to several other household appliances.

Other than expressing fear over causing a fire, this pattern had considerable difficulty in identifying obsessive ideations connected with her compulsions. The list used for treatment consequently was composed mostly of images of her ritualistic activity itself. Treatment led to a rapid rise in the latency of image formation but no change in her symptoms. Later in the sessions, two brief periods of three to four days each occurred in which the patient was able to reduce her checking. These improvements did not persist, however, and after 30 sessions she was referred to another psychologist for a different treatment for her checking and for treatment of several other behavioural disorders she had.

Patient 5 - This 62-year old, married accountant had a 20-year history of obsessive thoughts about remarks that had been made to him in the past. He was unable to stop thinking about these remarks which he had blown up out of all proportion. He sought relief in his work but had to resort to little psychomotor rituals in order to free his mind of the thoughts.

The first 30 sessions were spent in disrupting the obsessive thoughts with the result that they rarely came to his mind and even when they did, did not trouble him.

An additional ten sessions were spent on another ritual which centered around doubts that certain little tasks were 'impossible not to do'. These doubts which resulted in compulsion to perform each task correctly to prove his 'theory' quickly diminished and he was discharged after 40 treatment sessions.

Follow-up at one and three months showed that the treated obsessions had not returned despite another unrelated turmoil which caused him considerable anxiety and some increase in a number of minor untreated obsessional difficulties.

Patient 6 - This 17-year old, single female student had a five year history of obsessional thoughts concerning the fear that she was going to seriously harm someone she knew. Originally this had started with a fear that she would harm herself but by the time she came for treatment this fear had disappeared. Her ruminations were coupled with minor compulsions to check for and put away any objects with which she might cause injury. She also avoided walking beside people on the sidewalk or going downstairs so that she wouldn't be tempted to push them into oncoming cars or down the stairs.

Thirty treatments were given on a list of ideations centering around her horrific temptations to perform harmful acts. This resulted in only moderate improvement, the patient

claiming that the thoughts did not come less frequently when she encountered dangerous situations, but that they bothered her much less and she could quickly eliminate the thoughts from her mind. The fact that the thoughts were still coming prevented her from rating herself much improved even though she was functioning a great deal better.

Ten additional treatments were given to images of herself actually performing harmful acts but this produced little further improvement and she was subsequently discharged. One month follow-up showed that she was maintaining about the same level of improvement.

Waiting-List Control Patients

Patient 1 - This 27-year old, single girl had a four-year history of severe obsessive-compulsive neurosis. She had multiple symptoms the worst of which was a fear she had stolen something. This was coupled with rituals involving checking her purse, clothes, room, etc. to see if she had in fact stolen something. She also had fears of harming other people, of becoming contaminated, etc.

After the three-month waiting period, she was started on treatment but was unable to tolerate the shock and terminated shortly thereafter.

Patient 2 - This 42-year old, married business owner had a four-year history of obsessive ruminations concerning his wife having an affair with another (imaginary) man. Although he recognized that these fears were groundless, he nevertheless could not get the thoughts out of his mind even

when he was working.

After the three-month waiting period, he began treatment with a list of images of his wife participating in a series of extra-marital events with another man. This resulted in considerable improvement after 30 sessions but an additional ten were given before termination. This patient claimed to have improved to the point that the thoughts only came to him once in a while when he was particularly idle and even then they did not unduly trouble him. Follow-up results are not presently available on this patient.

Patient 3 - This 19-year old male student had a ten-year history of fears of contamination by dead people and people with cancer. As a result he avoided going close to funeral homes, hospitals and even got panicky if he saw a hearse go by. If he came close enough to a source of contamination he would be compelled to destroy his clothes, glasses and any other articles he felt may have been affected as well as engaged in elaborate washing rituals.

After the three-month waiting period, this patient began treatment with a list of ideations concerning his fear of contamination by dead people. However, it was found, after one or two sessions, that the maximum shock amperage did not cause him discomfort so that no disruption of images could take place. A subsequent attempt to find a shock device that would produce discomfort failed and the patient was referred to another psychologist for another treatment (modelling).

Patient 4 - This 29-year old, married female school teacher had fears of 'contracting sperm' from sources other than sexual intercourse, for example, toilet seats, towels, etc. This fear was coupled with ruminations that getting pregnant from such a source would lead to having a deformed child. The patient avoided going into public bathrooms and had to perform elaborate cleaning rituals each time her own bathroom was used by a male.

This patient has just begun cross-over treatments and no further information is available on her progress.

APPENDIX B

Rating Sheets Used in Evaluating Patient Symptomatology

SYMPTOM CHECK LIST

NAME: _____ DATE: _____

Absent _____ Most Severe

PSYCHIATRIST'S SYMPTOM CHECK LIST

NAME OF PATIENT: _____

NAME OF ASSESSOR: _____

DATE: _____

Please rate the severity of the following symptoms on a 0-10 basis where '0' represents total absence of the symptom and 10 represents the most severe condition of the symptom that the patient has ever experienced.

SYMPTOM	RATING

PSYCHIATRIC RATING

Please rate the following activities, in accordance with how severely they are impaired by the patient's current symptomatology, using the following rating method:

0 - no impairment
1 - mild impairment
2 - moderate impairment
3 - severe impairment
4 - total impairment

ACTIVITY	RATING
1. WORK ADJUSTMENT (including housework for females)	_____
2. SOCIAL ADJUSTMENT (interpersonal relationships to others)	_____
3. FAMILY ADJUSTMENT (interpersonal relationships with family members)	_____
4. SEXUAL ADJUSTMENT	_____
5. LEISURE ACTIVITIES (patient's enjoyment of recreational endeavours)	_____